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The JOURNAL OF THE DEPARTMENT of AGRICULTURE

VICTORIA - AUSTRALIA

VOL. XXXII PART 6

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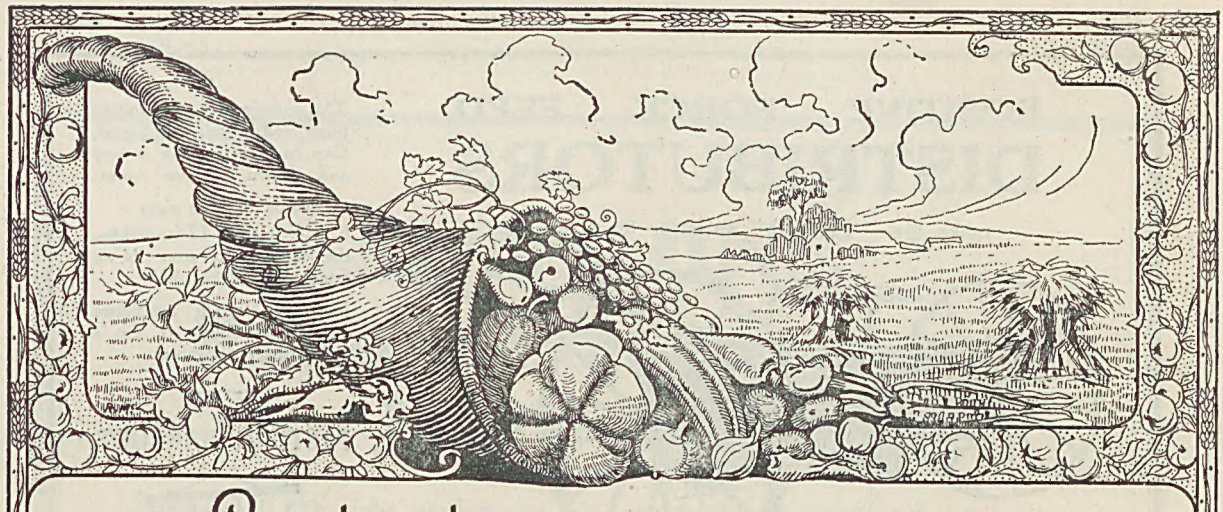

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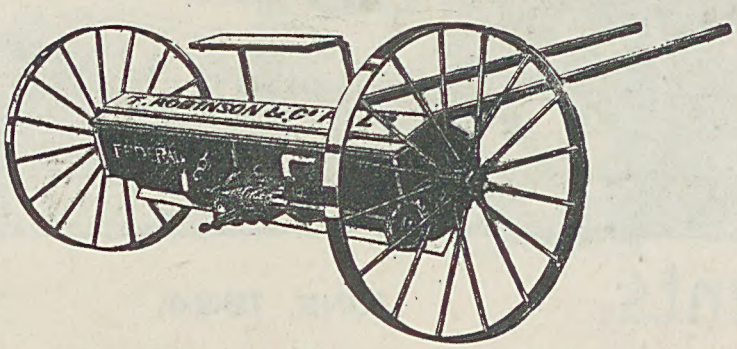

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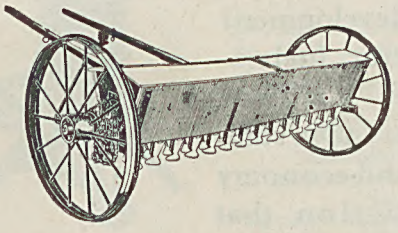

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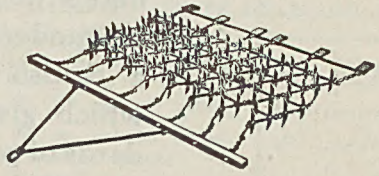

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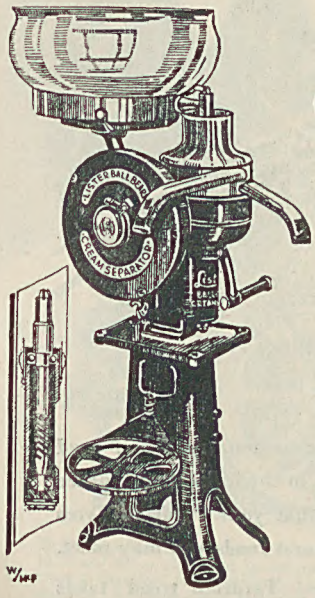

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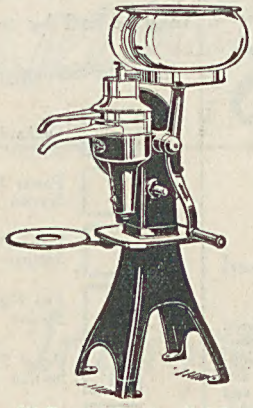

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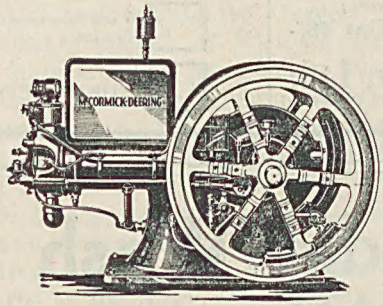

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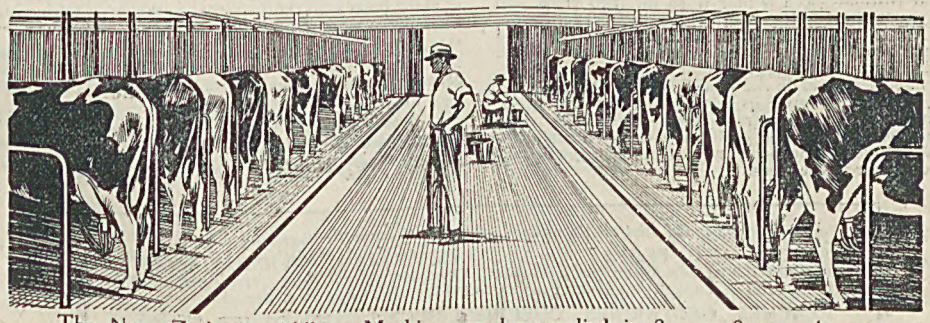

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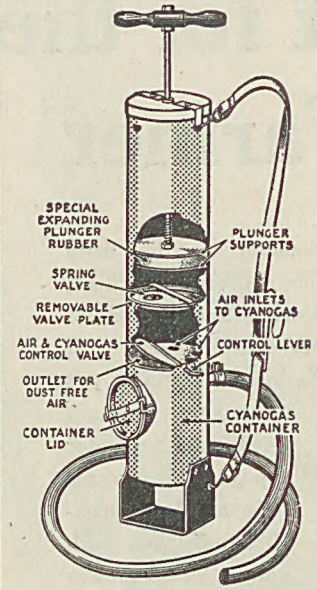

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The Journal of the DEPARTMENT of AGRICULTURE of VICTORIA

The Improvement of Light Pastures

By R. L. Twentyman, B.Agr.Sc., Agrostologist, Department of Agriculture

THE dairying and pastoral industries which contribute so largely to the primary wealth of Victoria are almost entirely maintained by grass-lands. The greater part of these consists of what is referred to as native pasture, and is of light carrying capacity, but in the more favoured districts, there are considerable areas of improved grass-land upon which vigorous pastures of introduced grasses and clovers are to be found. It is on such better class pastures that most of the dairy herds of the State are maintained, while the poorer ones are used for sheep-grazing.

Botanically the pastures on these two types of land are very different, the productive pastures usually consisting of rye-grass, cocksfoot, and some strongly growing annual grasses, together with either red, white, strawberry, or subterranean clovers, whereas the sheep pastures usually consist of such native grasses as danthonia, eragrostis, microlaena, and, in some places, kangaroo grass, together with small weeds and stunted suckling clover.

At first sight it might appear that the improvement from native to productive improved pasture could be effected simply by ploughing out the existing growth, and sowing in its place the seeds of desirable better grasses and clovers. Although in a few exceptional cases such a direct method might be successful, it will usually be found that, unless something more is done to encourage the introduced plants, their life will be short, and the field will soon revert to native pasture.

The composition of a pasture and its vigour of growth, can be regarded as the response to the combined effect of such influences as the type of soil and its fertility, climate, and the method of management. The poor native pastures of Victoria are usually unproductive because they are situated on shallow soils of low fertility in areas of rather unfavorable rainfall. Before we can hope to maintain improved pastures on such areas, it will be necessary to provide better conditions, particularly in respect to soil fertility.

Soil fertility largely controls the vigour and productiveness of a pasture, and any means of improving it will usually result in more vigorous growth. By the application of artificial fertilizers, the native pasture land can be greatly improved, and in some parts of Victoria the result has been such that dairying is now practised on land that previously would barely carry sheep.

On the better class of pastures the effect of applications of superphosphate is generally shown at first by an increased growth of most of the grass and clover species present, but particularly the annual types. Later, encouraged by the better soil conditions brought about by the increased growth of clovers, the perennial grasses, such as rye and cocksfoot, usually assert themselves, and it is largely to their development that the permanent improvement of the pasture is due.

With the poor native pastures, it is sometimes found that for a while the response to top-dressing with superphosphate is unsatisfactory. The soils on which these pastures grow are invariably found to be deficient in phosphoric acid and the other necessary plant foods, and the unsatisfactory result is mainly due to the absence of plants capable of making increased growth following the application of super.

It is for this reason that the mere top-dressing of unimproved native pasture occasionally does not give any marked improvement until seed of the more responsive plants is introduced.

Any permanent improvement of pastures on poor land necessitates the building up of soil fertility. To achieve this without using extravagant quantities of artificial manure, it is desirable to have present, or to introduce, a type of plant which, whilst capable of existing or establishing itself under poor conditions, will also, when encouraged by top-dressing, assist in the improvement of soil fertility, and later be able to take advantage of and grow strongly under the improved conditions.

The most useful plant for this purpose in southern Victoria is undoubtedly subterranean clover, which is peculiarly well suited to the climatic conditions, and will grow on either poor or fertile soils. In the districts of moderate rainfall, no other plant is capable of making such vigorous growth under so wide a range of soil conditions. For this reason subterranean clover provides a most useful link between the poor and good pastures, and enables the poorer ones to be greatly improved.

This clover is now commonly found on the roadsides throughout southern Victoria, and has become established over a large area of pasture land. In some cases it has been sown, but it frequently happens that the seed brought in by grazing animals from the roadsides or neighbouring paddocks is sufficient to enable the plant to become established.

On cropping land, the clover can be readily introduced by mixing a small quantity of seed with the superphosphate when sowing the last crop, and many very fine stands have been begun in this manner. An oat stubble paddock also provides an excellent opportunity for sowing the subterranean clover, if the seed and superphosphate are sown following a light surface cultivation of the ground.

On land that has been cropped previously, but which has been allowed to "go out to grass," the clover can readily be established by "combining" or scarifying the surface soil early in the autumn, and then sowing the seed with superphosphate. From 2 to 4 lb. of seed per acre is sufficient.

Subterranean Clover growing with an Oat Cover Crop.

On the light native pastures, the establishment of the subterranean clover is sometimes retarded by the extreme poverty of the soil, but this can be overcome by the use of superphosphate, which should be applied at the time of seeding. On the loose sandy soils its establishment is usually simple and rapid, but on the stiffer soils, particularly on the shallow, ill-drained soils overlying basalt, it does not make such good headway.

On pastures where there is a considerable amount of old dry feed present, this should be removed, either by heavy grazing or burning before sowing, and the ground surface should be lightly broken before broadcasting the seed.

Following its successful establishment, the young stand should be grazed only lightly during the first spring in order to permit the plants to develop runners and set seed. For the first few years the paddock should receive autumn dressings of superphosphate in order to thicken up and develop the pasture. During this time

the main object should be to develop the stand rather than to attempt to obtain heavy additional grazing from the area.

Once established, subterranean clover will withstand very heavy grazing, and providing it is occasionally top-dressed with superphosphate, it can readily be maintained in a productive condition. Light annual dressings should be given rather than heavier dressings at irregular intervals.

For the first few years after the establishment of subterranean clover on soils which favour its growth, it is usual to find it taking complete possession of the sward, but later on, as the clover builds up the soil fertility, the grasses begin to re-assert themselves, and the balance of the pasture is restored.

It is frequently said that subterranean clover crowds out the perennial grasses, and leaves the paddock with dry feed only during the summer months. While this dry feed is excellent fodder for sheep, it is hardly suitable for dairying, but the extra amount of feed available during its season of growth more than compensates for its complete cessation in the dry summer months, for except in favoured areas, most of the perennial grasses dry off rapidly in the hot weather.

In the past, many of the attempts at pasture improvement had as their basis the introduction of drought resistant plants into the sward. Although such plants were generally able to survive very dry periods, their growth usually ceased early in the summer, and they were unable to make satisfactory growth during the normal growing period of the pasture. The betterment of pastures by the use of subterranean clover does not aim at making growth when the weather is opposed to it, but rather to obtain extra growth at a period of the year when conditions are favorable.

Patches of Volunteer Subterranean Clover spreading over a native pasture.

A pasture usually consists of a number of different types of grasses and clovers all competing against one another, and the question of their survival is largely decided by vigour and productiveness under the particular conditions obtaining. For this reason, if subterranean clover does crowd out the other species, it does so usually because it is able to make better use of the existing conditions, and is more productive than the plants it replaces.

Dense growth of Subterranean Clover.

In some districts where rye-grass has been growing for many years on rather open soil, the introduction of subterranean clover accompanied by top-dressing, has resulted in the suppression of the rye-grass. This has been due partly to the fact that such soils were not ideal for the maintenance of perennial rye, but largely because the increased palatability of the top-dressed pasture has resulted in the stock keeping the pasture grazed closely, a condition which

favours the clover at the expense of the rye-grass.

Subterranean clover is rather sensitive to understocking, and once established, it grows best when heavily grazed. Where a pasture is lightly grazed, the taller-growing grasses tend to choke out the low-growing clovers, and when mixed pastures of grasses and subterranean clover are closed, and cut for meadow hay late in the spring, the clover may sometimes be severely checked.

With the extensive use of subterranean clover and the resultant pastures of heavier-carrying capacity, there has appeared a number of minor stock ailments associated with the heavier stocking of the paddocks.

As might be expected, trouble with footrot and worms is usually more prevalent on these improved pastures, for, under the condition of heavy stocking, the animals are much more liable to infection, and considerable care must be exercised to keep these diseases in check.

Another difficulty experienced with the improved pastures appears to be nutritional in character, and may possibly cause considerable losses. During the winter and early spring, occasional deaths occur among the apparently most healthy animals when they are grazing on the rich succulent feed of the strongly growing subterranean clover pastures. An allied complaint appears to be that of ewes and lambs failing to make satisfactory headway on this luxuriant pasture. Such trouble can be largely overcome by providing the sheep with dry feed, either as oaten chaff, or by giving them access to old dry feed on unimproved pasture or bush paddocks.

The trouble is usually prominent during years of heavy growth, and for this reason was not of much consequence last year, as subterranean clover then made poor growth owing to the unfavorable weather early in the year.

The present indications are that the trouble may be looked for this season, as the subterranean clover has already made an excellent start, and should provide a large bulk of feed during the late winter. The difficulty may be further accentuated by the fact that most of the pastures made poor growth last spring, and having been closely grazed during the autumn, there is now very little old dry feed on them.

Feeding some chaff, or giving the sheep access to poorer pastures will minimize the trouble. Should any deaths occur among the sheep grazing on vigorous subterranean clover pastures, the flock should be moved on to poorer pastures, and be left there some days before it is brought back on to the succulent feed.

Subterranean clover has proved a most useful plant in building up poor pastures, and although quite a large area of it can be seen in southern Victoria, there is still much land that could be improved by its use.

While the ultimate aim may be to establish permanent pastures of perennial grasses, this is too ambitious an objective for most of our light pasture land, and, at present, subterranean clover is the most valuable plant that can be grown on these soils. It provides a link between the poor and good pastures, and even where a perennial pasture is ultimately possible, subterranean clover will be found a most useful plant in preparing the way for the establishment of the better species.

Scientific Periodicals Catalogued

The Council for Scientific and Industrial Research has published a supplement to its Catalogue of the Scientific and Technical Periodicals in the Libraries of Australia. The first issue of this Catalogue, which was published early in 1930, *has proved to be of material assistance to scientific workers in Australia, and the present supplement has been found necessary to bring the work up to date. Copies of the original catalogue are available from the Council for Scientific and Industrial Research,* 314 *Albert-street, East Melbourne, C.2, at a cost of* 12*s.* 6*d.* (*plus* 1*s. postage*), *while the catalogue is being sold, from the same address, at* 5*s. per copy* (*plus* 4*d. postage*).

The Packing of Oranges

By Basil P. Krone, Fruit Packing Instructor.

Harvesting.

IF oranges are to be kept in sound condition for any length of time, too much emphasis cannot be placed upon the importance of careful harvesting, and when being wrapped each orange should be handled as carefully as one would treat an egg.

To ensure that the peel is not damaged during these operations, the finger nails of the picker should be clipped closely, and he should wear soft cotton or woollen gloves. When taking the fruit from the tree, it is well to leave a stalk of an inch or so on each fruit, and then with a second cut this piece of stalk may be clipped off close to the "button." This manner of harvesting will be found much cheaper and quicker than removing the stalk in one operation, for it can seldom be done neatly with one cut. With the "single cut" method, small "stubs" are often left on the oranges, and these cause injuries while the fruit is being placed in the boxes or grading machine.

Shrinkage.

Possibly the greatest bug-bear to the packer of citrus fruit is shrinkage. Even after a short journey, cases may reach their destination as though a layer of fruit were missing. Slack packing, caused by shrinkage, is generally more common in fruit packed whilst still fresh from the tree, and not properly sweated. Slackness may also occur as a result of bad grading. Whatever the reason a slack case is always discouraging to a buyer.

Curing or Sweating.

Sweating of oranges, lemons, and grape-fruit makes for good packing, but the economic aspect has also to be considered. Where transportation can be made quickly, as is the case when fruit is sent from the various Victorian citrus areas to the Melbourne markets, sweating is perhaps not essential, and this question must be left to the good judgment of the grower. However, as far as the export trade is concerned, it is a vital necessity that all Washington navel oranges be properly sweated before leaving Victoria.

It should be understood that tight packing will not control the slackness that occurs with unsweated fruit; therefore it is recommended that the oranges be kept in a well ventilated shed until they have slightly wilted. A week or ten days may be required, or even longer, according to the time of the year and atmospheric conditions. As an orange wilts, the surplus moisture evaporates from the peel; the cells then are less susceptible to damage, and thus the keeping qualities of the fruit are enhanced. During this process the grower is enabled to detect any specimens that are likely to develop mould, and these should be eliminated when the fruit is being packed.

Sizing.

If a sizing machine is not used, oranges should be sorted into the following sizes:—

- 2¼ inches—not less than 2¼ inches, and up to, but not 2½ inches.
- 2½ inches—not less than 2½ inches, and up to, but not 2¾ inches.
- 2¾ inches—not less than 2¾ inches, and up to, but not 3 inches.
- 3 inches—not less than 3 inches, and up to, but not 3¼ inches.
- 3¼ inches—not less than 3¼ inches, and up to, but not 3½ inches.
- 3½ inches—not less than 3½ inches, and up to, but not 3¾ inches.

NOTE.—The diameter of the fruit is measured from cheek to cheek, not from the stem to the navel.

Skilled packers generally divide these sizes again, packing the larger of each size into one case and the smaller into another.

Buyers, however, prefer machine-sized oranges, because with these they are certain of getting the exact sizes and counts they want. An advantage of the machine to growers is that washing, brushing, drying, polishing, &c.,

which add so much to overhead and handling expenses, when done by hand, are done by mechanical means at a fraction of the cost.

Wrapping.

For the local market, oranges are not usually wrapped in tissue paper, although some growers and packing companies use wrappers with a distinctive brand, and, as a result, such lines have become well known to buyers.

Standardized lines of good quality fruit, evenly sized, and well graded, are what the trade requires. Sour, coarse, or dry oranges ruin the best market; they bring the prices down all round, and are neither welcomed by the agent or the buyer.

If wrappers are used, care should be taken to get any design or brand they bear neatly over the top of the fruit, and not on one side, otherwise much of the effect will be lost.

The tails and unsightly ends of the papers will serve a useful purpose if gathered directly beneath the fruit with a semi-twist. They will then not only be out of sight, but will form a cushion for the fruit to rest upon.

(1) *PACKING IN THE AUSTRALIAN "DUMP" BUSHEL CASE.*

Inside measurement 18 x 8⅝ *inches* x 14¼ *inches.*
Capacity 2,223 *cubic inches.*

If oranges are packed on their "cheeks" in the Australian dump bushel case, they will give a more even surface on each layer than when packed with the navels facing upwards.

When packed with navels facing upwards they will perhaps present a level or even surface, but it is usually a false one, for often oranges of the same diameter will vary a good deal in depth; consequently the fruit has to be packed much higher than is necessary with the "cheek" method, in order to bring about a similar degree of "snugness."

Many experiments in both processes of packing have been made, and the "cheek" method is the one recommended.

The Correct Height of Fruit in the Cases.

Packing oranges to the correct height in the case, and the "snugness" of the specimens in each layer are the important features for safe carriage over long distances.

Each layer may be packed neatly and "snugly," but if it does not come sufficiently high to permit the lid to hold the complete contents securely, and to prevent the fruit from shaking about in transit, the work is a failure. Therefore the overcoming of this problem should be foremost in every packer's mind.

Before nailing on the lid, the top layer (no matter of what size the oranges) should be at least 1 inch above the top of the case, and never below or just level with it. There is a little "give" in all packs, and thus the oranges will be nice and snug when nailed up. Of course, the fruit must not be too high in the case; this will result in damage from over-pressing.

The size of the "pockets" or spaces between the fruit in the bottom layer controls its height in the case, and to assist the packer in overcoming this difficulty, a chart has been compiled to suit the "dump" case. If through variations in cases, or differing degrees of sweating, oranges do not give the desired height at the first attempt, the case should be repacked and the fruit placed more tightly or more loosely together, as circumstances require. If the desired height cannot be obtained with one particular count, another should be tried.

The 112 count (which gives a pack of fruit of excellent commercial size), frequently comes too high in the case, while a 96 count may be too low. In the 112 count, the oranges should be selected in such a way that sixteen of them fit more loosely than usual in the bottom layer. This will cause larger spaces between the fruit and permit seven layers (instead of six) with a total of 112, and the case will be properly filled.

In the 96 count there are also sixteen oranges in each layer, but only six layers in the case. To get this count to the correct height, the oranges selected should be of such a size that they will fit *more tightly* than usual. This will make the spaces between the fruit smaller, and so raise its height in the case by the time the top layer is finished. If these instructions are carried out, the packer will be able to manipulate both of these difficult counts.

Packing will be facilitated if the packer stands at one end of the case, which should be tilted slightly towards him. With the case on the slope the fruit will not roll about during the operation, and each specimen will stay in its position without being held; thus the packer's two hands will be free for quick and easy work.

The only packs necessary for adoption in the "dump" case are the 3–2, 2–2, and 2–1 diagonal "cheek" packs. These will provide for all the commercial sizes of oranges, including the very small and the very large. The

3–3 and 4–3 packs sometimes noticed on the market should be avoided whenever possible, as in these, unsightly holes or spaces are shown when the side of the case is removed.

Better results will be obtained if an effort is made to adopt as many 2–2 packs as possible. For instance, a small size may pack either 3–2 or 2–2; if so the latter pack should always be adopted.

The 3–2 pack for oranges should be used only when it has been found impossible to bring the fruit to the correct height by any other way.

The 3-2 (three-two) Pack.

(Use only for very small oranges.)

Commence packing by placing an orange in the left hand corner of the case; another in the right hand corner, and one in the centre. There are thus three oranges and two spaces. (The fruit should be placed on their "cheeks," and the "buttons" or stem-ends against the end of the case.) In the two spaces pack two more oranges which will then produce three spaces. Continue in this manner until the layer is complete. The last oranges in each layer should be reversed so that the "button" or stem-end will be against the end of the case, and the navel will be protected from rubbing against the wood.

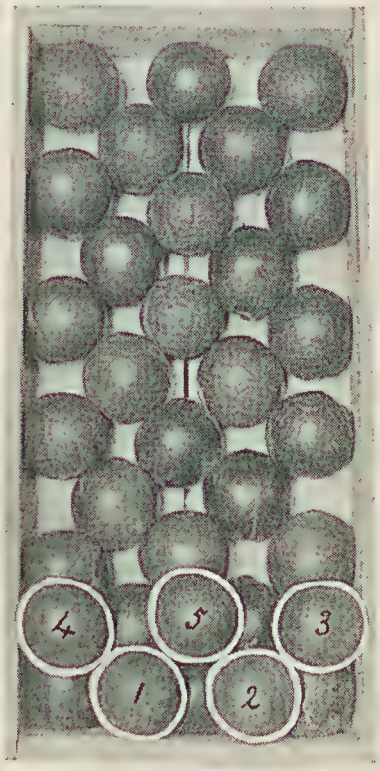


Fig. 1.—How to commence the second layer of the 3-2 pack in the Australian Dump Bushel Case. Note.—The oranges are placed over the "pockets" or spaces formed by the fruit in the layer beneath, not directly on top of them.

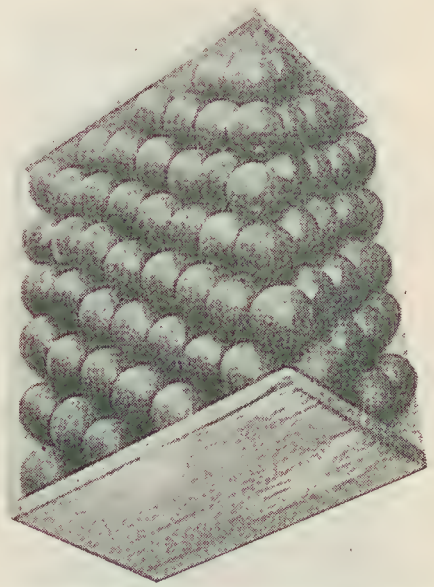


Fig. 2.—Finished case of the 3-2 pack in the Australian Dump Bushel Case. Lid and side have been removed to show arrangement of the fruit. Note.—No single orange rests directly on top of another.

The second and succeeding layers are packed in exactly the same manner, except that the fruit is placed over the spaces or "pockets" caused by the fruit beneath, and does not rest directly on top of the other fruit. Fig. 1 shows how to commence the second layer of the 3–2 pack. Fig. 2 illustrates the finished case of a 3–2 pack with the lid and side removed to indicate the arrangement of the fruit. It will be noticed that no orange rests directly on top of another in any direction.

The 2-2 (two-two) Pack.

(Use for small, medium, and large oranges.)

(*Special Note.*—Most of the commercial sizes should be packed on the 2–2 system.)

Commence the 2–2 pack by putting one orange in the left hand corner of the case on its cheek with the button or stalk against the end of the case. Place another half-way between the first and the side of the case, thus making two equal

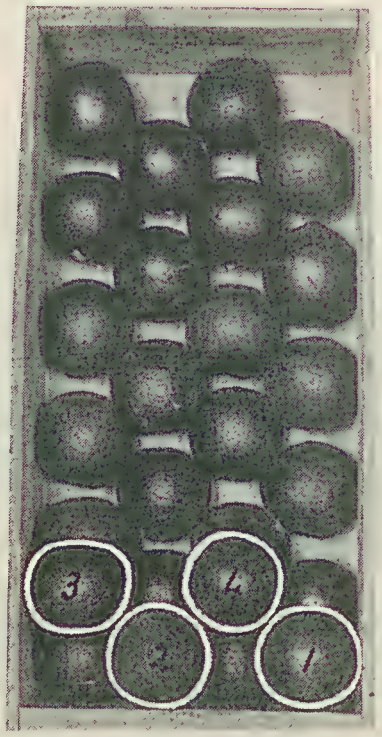


Fig. 3.—How to commence the second layer of the 2-2 pack in the Australian Dump Case. Note.—The oranges are placed over the "pockets" formed by the fruit in layer beneath, not directly on top of them.

spaces. In these two spaces pack two more oranges. Continue packing by placing the oranges two and two alternately in these spaces until the layer is finished, reverse the last two oranges in each layer so that the button or stalk will be against the end of the case.

The second and succeeding layers are packed in exactly the same manner as the first, except that the oranges are placed over the "pockets" or spaces formed by the fruit beneath, and not directly on top of them. Fig. 3 shows how to commence the second layer of the 2–2 pack. Fig. 4 depicts a finished case of the 2–2 pack with the lid and side removed to reveal the arrangement of the fruit.

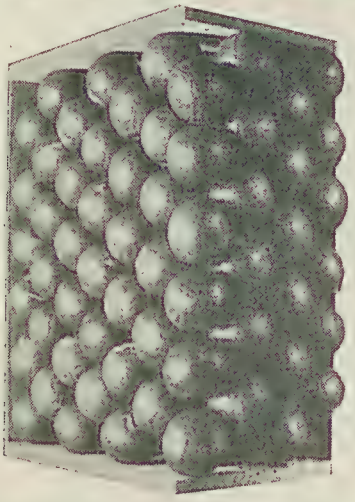


Fig. 4.—Finished case of the 2-2 pack. Lid and side have been removed to show arrangement of the fruit. Note.—No single fruit rests directly on top of another in any direction.

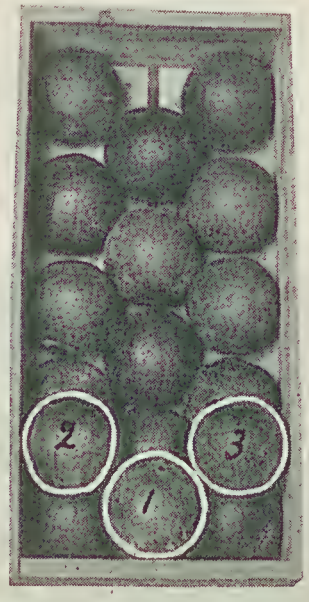


Fig. 5.—How to commence the second layer of the 2-1 pack in the Australian Dump Bushel Case. Note.—The oranges are placed over the "pockets" formed by the fruit in layer beneath, not directly on top of them.

The 2-1 (two-one) Pack.

(Use only for very large fruit.)

Commence by placing the first orange in the left hand corner of the case on its cheek with the button or stem end against the end of the case. Put the second in the right hand corner so as to make a space in the middle; in this put another orange, thus making two spaces. Continue packing first two and then one until the layer is complete. As in the other packs the last oranges in each layer should be reversed to protect the navels. The second and succeeding layers should not rest

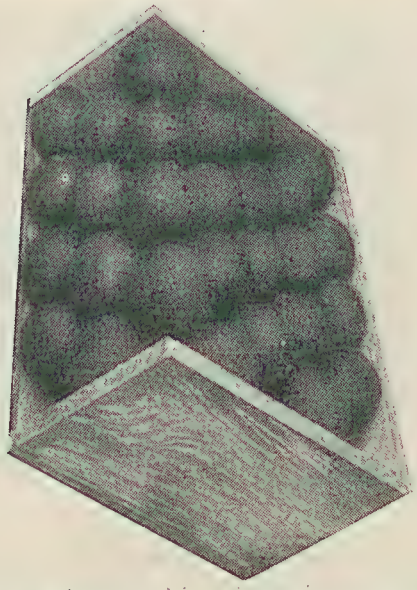


Fig. 6.—Finished case of the 2-1 pack in the Australian Dump Case. The lid and side have been removed to show arrangement of the fruit.

directly on top of the fruit beneath, but in the spaces. The method of commencing the second layer is shown in Fig. 5. The finished case of a 2–1 pack with lid and side removed to illustrate the arrangement of the fruit is shown in Fig. 6.

How to Read the Packing Chart.

The "layer" column is the key to the successful packing of most fruits in any size or shape of box. It will enable the packer to surmount those little difficulties which sometimes prevent him from bringing the fruit to the desired height in the box.

The packer with a knowledge of the "layer count" *can alter the size of these pockets* by packing more tightly or more loosely the fruit in the layer. For instance, if a 2–2 pack with a 6 x 5 layer (this means counting the layer lengthways) be too high in the box, the packer may alter his "layer count" to 5 x 5, which would open the "pockets" a little more, and so reduce the height of the fruit if necessary. If the 5 x 5 layer be tried first and found unsatisfactory, then the 6 x 5 layer should be adopted.

Knowing the number of layers packed in the case, the packer can, by counting the top rows, and referring to the packing chart, tell at a glance the actual count of oranges in the box. This count should then be stencilled on the box with the other essentials.

Size.	Pack.	Layer.	
Means:— All oranges that actually measure in diameter from cheek to cheek the size stated, and includes all other oranges over this measurement and under the next size.	Means the count across:— 3-2 Pack 2-2 Pack. 2-1 Pack.	Means the count lengthways:— 6 x 5 5 x 5 4 x 4	**Layer.** Means:— The number of LAYERS contained in the box for the pack used. **Total.** Means:— The total number of oranges contained in the box.

Packing Chart for Oranges in the Australian "Dump" Bushel Case.

LOCAL MARKET.

(18 *x* 8⅔ *x* 14¼ *inches, inside measurements*).

Size.	Pack.	Layer.	Layers.	Total.	Remarks.
Inches.					
2¼	3—2	6 x 5	9	248	Small (smallest 2¼″
2⅜	3—2	5 x 5	9	225	Pack more loosely than usual
2 7/16	3—2	5 x 5	8	200	Large (almost 2½″)
2 9/16	2—2	7 x 6	7	182	Medium size 2½″
2 11/16	2—2	6 x 6	7	168	Large (almost 2¾″)
2¾	2—2	6 x 5	7	154	
2⅞	2—2	5 x 5	7	140	
3	2—2	5 x 4	7	126	Smallest 3″
3⅛	2—2	4 x 4	7	112	
3¼	2—2	4 x 4	6	96	Smallest 3¼″
3⅜	2—2	4 x 3	6	84	
3½	2—1	5 x 5	5	75	
3⅝	2—1	5 x 4	5	68	
3¾	2—1	4 x 4	5	60	
3⅞	2—1	4 x 3	5	53	

SPECIAL NOTE.—Actual measurements of the fruit in many packing experiments prove that the diameter of oranges in the 200 count is about 2 7-16 inches, and not 2⅜ inches as commonly supposed; that the 182 count is 2 9-16 inches, not 2½ inches, and the 168 count 2 11-16 inches, instead of 2⅝ inches. The diameter of oranges in the other counts increases by ⅛ inch for each count, as shown in the chart.

Timber required to make the Australian "Dump" Bushel Case, Inside Measurement, 18 x 18⅔ x 14¼ inches.

2 Ends, one piece each, 14¼ inches x 8⅔ x ¾ inch.

2 Sides three pieces each 19½ inches x 4⅝ inches x ⅜ inch.

Lids and Bottoms one piece each 19½ inches x 8⅔ inches x ¼ inch.

NOTE.—Two-piece sides are preferable to three-piece sides, and one-piece lids and bottoms are preferable to those of two pieces.

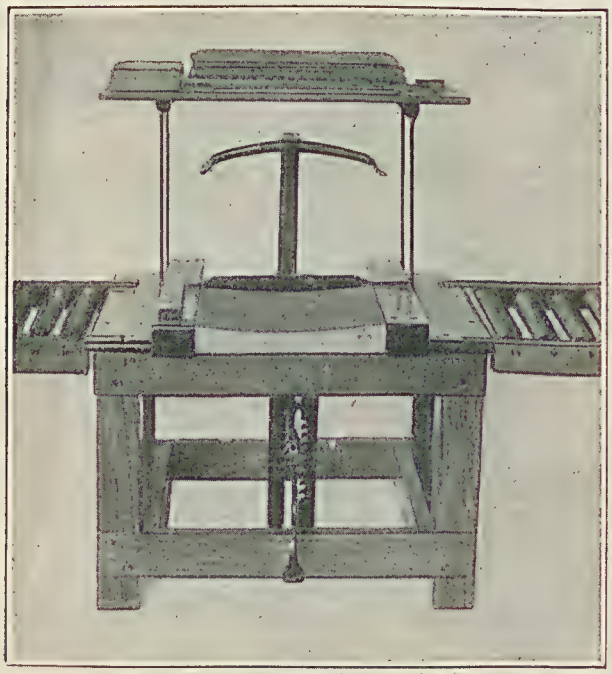


Fig. 7.—Nailing-Down Press.

Nailing Down.

The manner in which this work is conducted is almost as important as packing the fruit. The following suggestions are made, not only with a view to minimizing the risk of bruising, but also to a saving of time.

Sometimes much dumping of a case is resorted to in order to make the fruit "settle down." This is not only a waste of time, but may in some instances seriously damage the fruit.

Nailing down should never be done on a hard or uneven floor. Battens should be placed beneath each end of a case. A lidding-press is a great convenience, and should be in every packing-shed. The pressure that is exerted directly on the fruit is relieved if a case be nailed up on the bare floor. In the lidding-press space is provided beneath the bottom of the case so that with light pressure the fruit can be forced down, and the lid nailed on. A useful type of lidding-press is shown in Fig. 7.

Wire-Strapping of Cases.

Wire-strapping of fruit cases prevents breakages and ullage in transport. It is recommended by railways, shipping, and other authorities; indeed, the Victorian Railways Department will pay claims for ullage and damage to fresh fruit, consigned at "Owner's Risk Rate" if the cases are efficiently strapped with wire. It is, therefore, an insurance to the fruit-grower.

Fig. 8.—How to commence the second layer of the 3-3 pack in the Orange Export Case. Note.—Oranges must not rest directly on top of each other, but in spaces beneath.

Wire-tying is particularly important where softwood cases are concerned, as nails draw more easily from them than they do from those made of hardwood. Thousands of wire-bound cases of fruit are now shipped from Victoria. There is, however, a right and a wrong way of using the wire.

Cases are sometimes forwarded with the wires placed nearly 6 inches in from each end, or may be one wire only, around the centre. Where such cases have even a slight bulge they invariably open up with fruit in the top and bottom layers damaged by the wire pressing on these parts.

(2) *THE CALIFORNIAN ORANGE EXPORT CASE.*

(24 x 11½ x 11½ *inches inside measurements, clear of the division. Capacity,* 3,174 *cubic inches.*)

Packing.

This type of case is one of the easiest to pack. Not only can all sizes be fitted in it without trouble in their respective packs, but they come to the correct height without difficulty, which is very important.

Cases intended for export of citrus fruit should be so made that there will be a free circulation of air both around and through the cases when stacked. The lathes should be widely spaced, but so arranged that the edges will not cut the oranges.

The packs employed for this case are known as the 3–3, 3–2, 2–2, and 2–1 diagonal packs. These will provide for all sizes of oranges, and also grape fruit.

So far as the exporting of oranges to London is concerned, **it is absolutely imperative that the number of counts be limited to five,** namely, 216, 200, 176, 150, and 126. To do this the 3–3 and 3–2 packs only will be employed. It is also recommended that each orange be packed with the navel facing upwards. Large sized oranges should not on any account be packed for export; all such fruit should be sold locally.

As soon as the fruit has been packed, it should be precooled without delay at a temperature not lower than 38 deg. nor higher than 42 deg.

Sizing and Grading.

Although oranges are packed and marketed by counts, it is necessary that the fruit in any case should not vary in size by more than a quarter of an inch.

A good "standard" grade should be aimed at by the packer. To attain this, the fruit

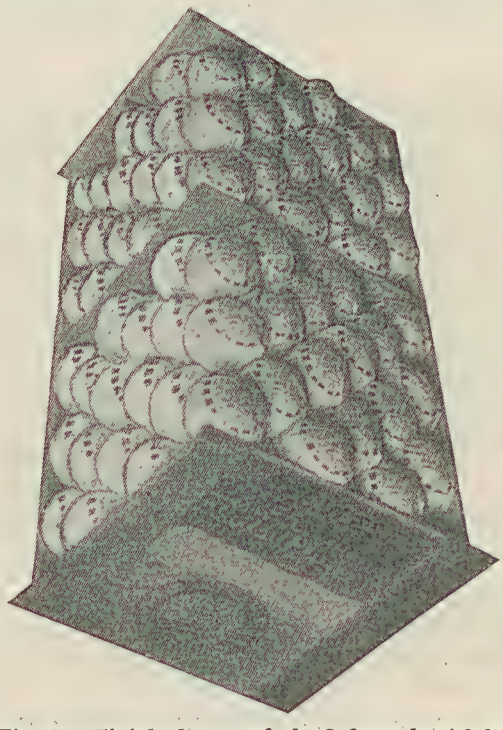


Fig. 9.—Finished case of the 3-3 pack with lid and side removed to show position of fruit. (There are 216 oranges in the case).

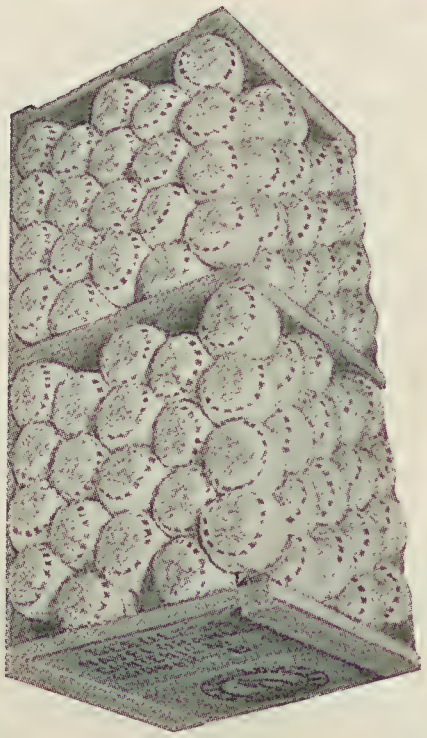


Fig. 10.—Finished case of the 3-2 pack with lid and side removed to show the position of the fruit. (There are 200 oranges in the case).

selected must be reasonably uniform in shape, colour, and texture, and free from prominent or dirty looking markings. The markings should not exceed 10 per cent. of the superficial area of the fruit.

Only sweet, juicy oranges should be exported. A dry orange means that the proportion of juice extractable is less than 35 per cent. by weight of the whole orange. In order to ascertain the proportion of juice obtainable from an orange, the halves of a freshly divided fruit should be rotated upon a conical glass lemon-squeezer under hand pressure only. The resultant juice should be strained through a strainer of not less than 30 meshes to the lineal inch.

A mature orange is one in such condition that the quantity of N/10 soda solution required to neutralize the acidity content of 10 cubic centimeters of juice drawn from the mixed juices of not less than five oranges taken at random from any case or cases bearing a similar mark shall not be more than—

(*a*) 30 cubic centimeters in the case of oranges intended for shipment to European destinations; and

(*b*) 26 cubic centimeters in the case of oranges intended for shipment to any other destination.

The 3-3 (three-three) Pack.

Commence by placing one orange in the left-hand corner of the case with navel facing upwards. Place two others so that they divide the remaining space between this first orange and the side of the case into three equal spaces. In these pack three more oranges, and so continue until the layer is finished. The second, and succeeding layers are packed in exactly the same manner as the first, except that each orange is placed over the "pocket" or space caused by the oranges beneath. Figure 8 shows how to commence the second layer of the 3-3 pack, and Figure 9 illustrates a finished case of the same pack.

The 3-2 (three-two) Pack.

Begin packing by placing one orange in the left-hand corner of the case, another in the right-hand corner, and a third in the centre between these two (three oranges and two spaces). In the two spaces above pack two more oranges so

Fig. 11.—Finished case containing 176 oranges.

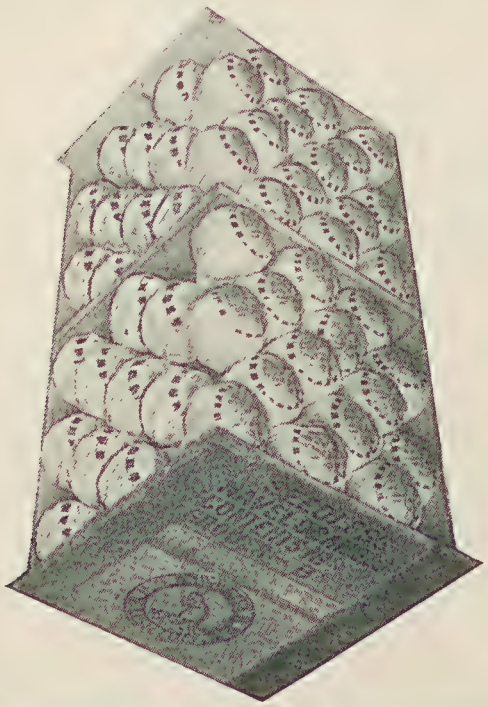


Fig. 12.—Finished case containing 150 oranges.

as to produce three spaces, and continue in this manner until the layer is complete, taking care that all navels are facing upwards.

As in all other diagonal packs the second and succeeding layers are packed in exactly the same manner as the first, except that the fruit is placed over the "pocket" or spaces caused by the oranges beneath, and does not rest directly on top of them. Fig. 10 shows a finished case of the 3–2 pack.

Branding.

Much confusion is caused by unnecessary stencil marks. This will be obviated if particulars as indicated below appear in legible characters on the cases.

On one end—

The agent's or shipper's number.

On the other end—

(*a*) A true description of the fruit, e.g., "Washington Navel Oranges" or "Valencia Oranges," as the case may be.

(*b*) The name or registered brand of the grower or exporter.

(*c*) The word AUSTRALIA.

(*d*) The number of oranges contained in the case.

(*e*) The grade designation of the fruit.

Labelling.

Apply some paste to the ends of a dozen boxes, but first of all the labels should be placed in a deep, wide dish of cold water with the printed sides facing downwards. This will allow the plain sides to become wet as each preceding label is finished.

The application of paste to a dozen boxes at a time is preferable to labelling one box at a time, as it gives the paste a chance to soak in, and fill the pores of the soft wood before the label is applied.

The cases should not be handled till after the labels have dried on them.

Formula for Making Paste.

½ lb. flour whipped thoroughly to a cream in ½ pint of cold water.

¼ oz. powdered alum.

4 pints of boiling water.

Do not use until cold.

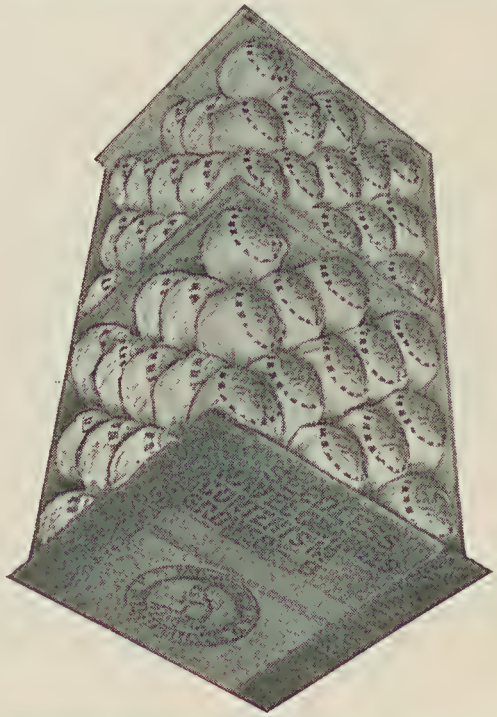


Fig. 13.—Finished case containing 126 oranges.

Specifications of Timber used in the Construction of the Orange Export Case.

Ends and centre, 3 pieces, 11½ inches wide, 11½ inches deep, 11-16 inch thick.

Sides and bottoms, 6 pieces, 5¼ inches wide, 26 1-16 inches long, ¼ inch thick.

Lids, 2 pieces, 5¼ inches wide, 26 5-16 inches long, 3-16 inch thick.

Cleats, 2 pieces, ¾-inch wide, 11½ inches long, ¼ inch thick.

NOTE.—Lids are cut a quarter of an inch longer than the sides and bottoms to allow for the bulge.

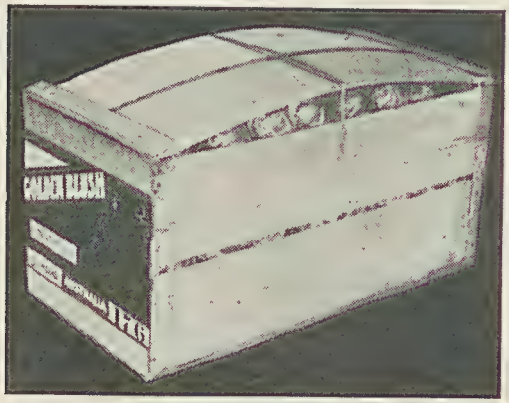


Fig. 14.—Finished case lidded and ready for export. Note the bulge.

Packing Chart for the Californian Orange Export Case.

(24 x 11½ x 11½ inches inside measurements, clear of the division. Capacity 3,174 cubic inches.)

Size.	Pack.	Layer.	Layers.	Total.
Inches.				
2½	3—3	4 x 4	6	288
2⅝	3—3	4 x 3	6	252
2¾	3—3	3 x 3	6	216*
2⅞	3—2	4 x 4	5	200*
3	3—2	4 x 3	5	176*
3⅛	3—2	3 x 3	5	150*
3¼	3—2	3 x 2	5	126*
3⅜	2—2	4 x 3	4	112
3½	2—2	3 x 3	4	96
3⅝	2—2	3 x 2	4	80
3¾	2—1	3 x 3	4	72

* Indicates the best selling sizes or counts to pack for export.

Book Review

"Suppression of weeds by fertilizers and chemicals."*

THIS handbook contains the practical information necessary for the successful use of all the well-known herbicides under English conditions. In a foreword by Sir A. D. Hall, it is pointed out that, in England, the high cost of labour as compared with the present low prices for agricultural produce, renders the old elaborate cultivation methods of that country no longer economic, and the relative cheapness of chemical methods is affording them an increasing popularity.

Under Victorian conditions, in the majority of cases, it is not likely that the chemical treatment of weeds in grain fields will gain favour, but in those instances where such a course seems likely to be a profitable one, farmers would do well to refer to the information contained in this booklet.

The herbicides dealt with include sulphuric acid, copper, and iron sulphates, sodium and potassium chlorates, arsenic compounds, salt, carbon bisulphide, ammonium thiocyanate, and oils.

Discussing substances which may be used as herbicides and as fertilizers, the author mentions the use of ammonium sulphate, nitrate of soda, calcium cyanamide, kainit, and lime. Under our conditions the need for nitrogen, potash, and lime is not general, and until the profits derived from the use of nitrogenous manures show a substantial increase over the cost of such manuring, their use in weed control must be confined to special crops, and to lawns, golf courses, sports grounds, &c.

The permanent eradication of deep-rooted perennial weeds is not fully discussed.

—A. M.

* By H. C. Long, B.Sc. (Agri.). The London Caledonian Press Ltd., March 1934, p. 56, Fig. 17.

Bee-keeping for Beginners

Part II.—The Hive

By J. W. Thomlinson, Apiary Inspector

[*The first article of this series appeared in the February issue of this Journal*]

ALTHOUGH honey bees have been domesticated for hundreds of years, it was not until about the middle of last century that any great advance was made in the practical methods of honey production. The hives were usually straw skeps or wooden boxes, some of which were of rather elaborate design, and provided with a second or upper chamber for the storage of surplus honey which was removed when the container was full, the honey in the lower chamber being left as winter stores for the bees. The common practice, however, was to use a single skep or box.

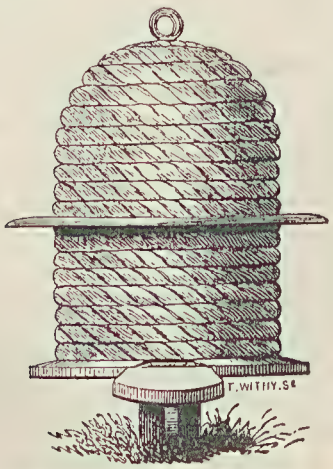


Fig. 1.—An old-style hive.

During the autumn the weight of each hive was tested by lifting it, and a note made of the heaviest. Later, these were removed and placed over a pit containing burning sulphur, the fumes of which destroyed the bees. The honey was then taken from the hive, and the combs containing brood discarded.

Students in bee culture had reported successful experiments in inducing bees to build comb in an enclosed frame, and complicated forms of frame hives were in existence, but while these were of interest from a scientific point of view, they were of little practical use to the bee-keeper.

With the introduction of the Langstroft hive in 1851, bee-keeping methods were revolutionized. The comparative simplicity of the construction and working parts of this hive gave the bee-keeper complete access to the brood nest. Up to this time there had been several theories as to the interior working of the hive, but now the colony could be studied as an open book. Further research was greatly assisted by the ease with which combs built in the wooden frames could be removed, examined, and replaced, without any apparent discomfort to the colony. In this way further knowledge was obtained, and control of disease became possible.

Numerous types of movable frame hives have since been placed on the market, and in the hands of capable apiarists have given good results, although glowing accounts of their alleged superiority have often induced inexperienced men to purchase a type of hive totally unsuited to the novice.

To get the best results a hive should consist of as few working parts as possible. With the exception of supers built to hold comb-honey sections, supers or upper stories should be of the same dimensions, and take the same sized frames as the body or lower chamber. These features will be found to exist in the modern Langstroth hive (Figs. 2 and 3). This hive is obtainable in eight, ten, and twelve frame sizes, and is the recognized standard throughout America, South Africa, New Zealand, and Australia. The eight and ten frame sizes are the most popular. In districts where there is a restricted honey flow, the eight frame size probably would be the most suitable.

The single story hive (Fig. 2) is composed of three parts—the bottom or floor board, the body, and cover. or lid. With the exception

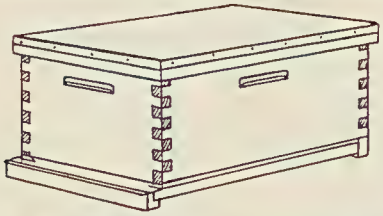


Fig. 2.—Single-story Langstroth hive.

of the entrance, the floor board should be perfectly bee-tight when nailed to the body, and to obtain that result a solid one-piece board is recommended. Floor boards composed of pieces fitted together invariably shrink, causing considerable annoyance and discomfort, by allowing the escape of irritated bees during moving operations.

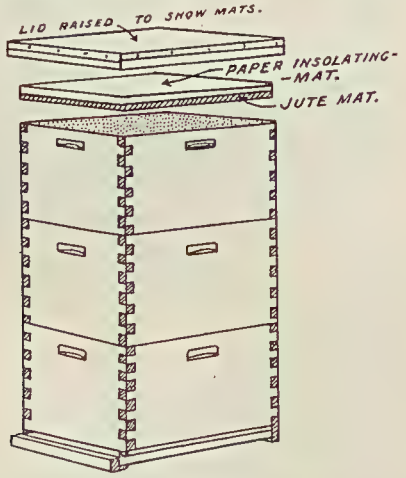


Fig. 3.—Three-story Langstroth hive.

The solid floor board shown in Fig. 4 has rebated cleats nailed on each end, with the object of keeping it clear of the ground and to prevent warping. Red gum or jarrah makes the best cleats. American red pine is the most suitable timber for the floor. Fillets $\frac{7}{8}$ inch wide by $\frac{3}{8}$ inch are nailed flush with the edges and one end as shown; the fillets form a seat for the body of the hive, and raise it $\frac{3}{8}$ inch above the floor, leaving a full width entrance for the bees at one end; this end protrudes $1\frac{1}{4}$ inch beyond the hive body, forming a landing stage.

The floor board should be firmly nailed to the hive body, care being taken to see that the rear and sides are flush. Another form of floor—one which I have used myself, on the grounds of economy during the timber shortage after the war—is shown in Fig. 5. The actual floor is a sheet of galvanized iron (26 gauge). One sheet 6 feet x 3 feet will give sufficient material for eight floors for eight frame hives, or seven floors for ten frame hives.

The method employed is to cut the iron to the exact size of the hive body. Fillets of wood, or raisers, $\frac{7}{8}$ inch wide x $\frac{3}{8}$ inch thick, are then nailed to the under sides and one end of the body. The sheet of iron is next placed on top of the fillets, and secured with 1-inch nails.

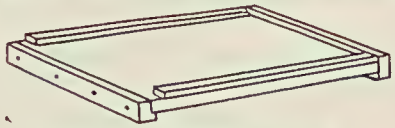


Fig. 4.—Solid floor board.

A piece of pine 3 or 4 inches wide by $\frac{7}{8}$ inch thick is next nailed across each end, the back piece flush with the hive body, and the front piece protruding $1\frac{1}{2}$ inch. The iron is then further secured by fixing with 2-inch nails a strip of wood $\frac{7}{8}$ inch x $\frac{1}{2}$ inch along the edge between the pine. A cleat of red gum or jarrah, 2 inches x 1 inch, nailed flush across each end, is advisable to prevent the pine from coming in contact with the damp earth. The iron at the hive entrance must be tacked down; short brads and a nail punch may be used for the purpose. The iron must not protrude beyond the hive entrance, where it may come in direct contact with the rays of the sun during the summer.

The cover or lid should be perfectly watertight, and for convenience when moving, as compact as possible. The cover recommended is the type shown in Figs. 2 and 3, and is known as the Beuhne cover. It is made

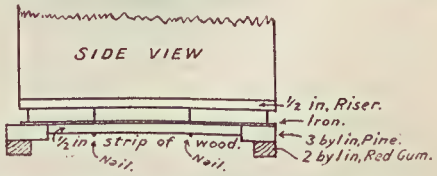


Fig. 5.—Showing construction with galvanized iron floor.

on the telescopic principle, and consists of a frame of $\frac{7}{8}$-inch timber, about $1\frac{1}{4}$ inches deep, made to fit over the hive body; light boards are then nailed securely across the top

and cut flush with the sides; a few sheets of newspapers, neatly trimmed to the exact size of the cover, are then placed over the boards, for the purpose of insulation. On top is placed a sheet of 26-gauge galvanized iron, cut to allow a 1-inch lap all round, the lap being bent over and nailed to the sides of the frame. It is advisable at all times to place a mat between the cover and the top of the frame, firstly, to prevent the bees from attaching the cover to the frames; and, secondly, to keep the colony snug in winter and to guard against the direct heat of the sun on the cover penetrating to the combs during summer. A very serviceable jute mat, to be placed directly over the frames, can be made from a piece of wheat sack cut to size. Weekly newspapers make excellent insulating mats if trimmed to size, and the edges and ends treated with flour paste to prevent the pages blowing about during removal.

Home-made Hives.

Compared with the factory product, the average home-made hive and frames are, at best, a make-shift; they lack that neat fitting and consequent rigidity of the machine-made article, necessary to withstand frequent handling and stress of weather. Unless the making of hives and fittings be regarded in the light of a pleasant pastime, hive bodies and frames should be purchased. They may be assembled in the home workshop, where also the floor covers and lids may be made.

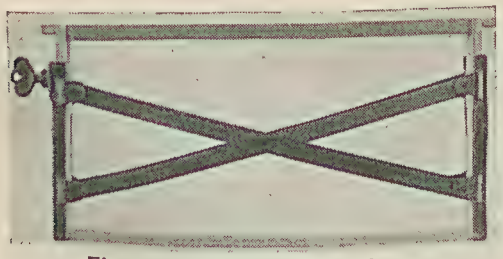


Fig. 6.—A frame-nailing form.

For the benefit of those who prefer to make the complete hive, the following measurements are given for a hive body to contain eight frames:—Inside measurement — Sides, 18¼ inches, ends 11¼ inches, depth 9½ inches. The ends should be made from ⅞-inch timber and rebated ½ inch wide, and the same depth along the top, to take the end bars of the frames. The outside measurement of the hive will, of course, depend entirely upon the thickness of the timber used for the sides. If frame-making is to be undertaken, the best plan would be to secure as a pattern a frame from a local bee-keeper or from one of the supply stores.

Frames.

The most satisfactory frame for use with the Langstroth hive, and probably the most popular in this State, is that known as the Victorian pattern Root Hoffman self-spacing

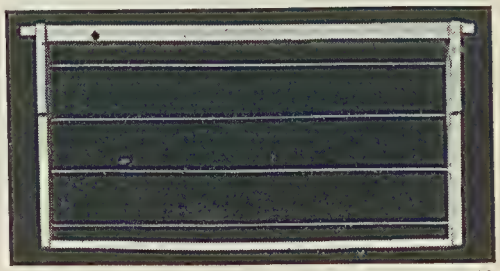


Fig. 7.—Victorian pattern Root Hoffmann self-spacing frame, showing method of wiring.

frame (Fig. 7). The parts are made for a maximum of strength, without causing the frame to be in any way cumbersome.

By using a frame-nailing form (Fig. 6) when assembling the frames, a saving of time is effected, and the parts are held firmly in position for nailing, thus reducing to a minimum the possibility of split-end bars. For attaching the top bar, it is advisable to use two 1¼-inch fine gauge nails in each end, and one 1-inch nail for each end of the bottom bar.

Wiring Frames,

It is almost impossible to handle a frame of Langstroth dimensions filled with honey unless it has been reinforced. Some form of reinforcement is also necessary to support the comb during hot weather, and to avoid breakage during transport, as well as to meet any rough usage, while passing through the honey extractor. Reinforcements of wood and of wire have been used for a great many years. In reinforcing with wood, the frames are equally divided by a narrow strip of wood fitted and nailed, either horizontally between the end bars, or in a perpendicular position between the top and bottom bars.

This method, however, has been practically discarded in favour of wire reinforcing. Four horizontal wires are recommended (Fig. 7), and of a much stouter gauge than that generally used. I would be inclined to say that the

best results are obtained with galvanized wire of 24 gauge; galvanized wire is to be preferred on account of its rust-resisting qualities.

Fig. 8.—Frame fitted with full sheet of comb foundation.

To fasten wire in a frame, first cut to the required length, then thread through the holes made in the end bars for the purpose, drive a small tack ½ inch below the hole through which the wire is protruding at the top of the end bar, twist the wire around the tack, and complete driving; this should leave the wire firmly fastened; strain reasonably tight and finish by passing the end firmly around the wood and twisting on to the wire again.

Comb Foundation.

In order to induce bees to build comb within a frame, it is necessary to provide a guide or base, and for this purpose comb foundation is used. Comb foundation is made by passing thin sheets of beeswax between engraved rollers, and during this process the wax receives an impression corresponding in size and shape to the base of worker cells naturally built. This is readily accepted by the bees, and if honey or a flow of nectar be available, cells are quickly formed on the artificial base provided.

The use of a full sheet of comb foundation in each frame is recommended (Fig. 8). By this means the building of drone comb is reduced to a minimum, and a saving in time and the honey necessary to be consumed by the bees for the natural production of wax is effected. However, where it is not possible to provide a full sheet for each frame, a strip of comb foundation 1 inch or more in width may be used (Fig. 9); this strip is known as a starter.

Combs built from starters usually contain a large proportion of drone cells; this is undesirable from an economic point of view. A piece of brood 6 inches square will contain 1,800 workers, or in the case of drone brood, over 1,000 drones, so it will be seen that a comparatively small piece of drone comb in the brood nest may be responsible for over 1,000 useless consumers, and the loss of 1,800 workers to the colony.

For the purpose of fastening comb foundation to the frame, the Victorian pattern frames have a groove in the top bar running the full length between the end bars. To attach a full sheet of foundation comb start at the bottom of the frame, and pass the sheet over and under the alternate wire; then work the edge in to the groove provided for the purpose; next pour a small quantity of melted wax along the groove and tilt back and forwards until cooled. The other side should be treated in the same way. Care should be taken to see that the wax is not too hot, otherwise the foundation will be melted.

Should it be preferred, a small quantity of glue brushed on the edge of the foundation before it is inserted in the groove of the top bar may be used instead of melted wax.

Most bee-keepers embed the wires of the frame in the comb foundation after it has been secured to the top bar. To perform this operation without damage to the foundation requires a certain amount of skill and practice. In the opinion of the writer embedding

Fig. 9.—Frame fitted with starter of comb foundation.

is unnecessary, provided that the hive is set reasonably level, and that the foundation is passed over and under the alternate wires as recommended, care being taken to see that the foundation is firmly attached to the top bar.

Pig Rearing

Feeding

By A. J. Gill, Senior Herd Tester

Skim-milk and butter-milk are of equal feeding value. Care should always be taken to see that the butter-milk has not been adulterated by the water used in washing the butter; drainage from the testing room must be specially avoided. There is a belief prevalent among farmers that if milk is to produce the best bacon it should be allowed to sour and thicken before being fed. There is no ground for this belief, and one reason why it should not be acted upon is that milk which has been put in dirty casks to thicken may cause the death of many young pigs. Sweet milk is certainly safer, and produces pork and bacon of first class when fed with grain. In feeding milk, to get the best results sufficient grain should be added to provide the carbo-hydrates required to balance the ration. Where food is fed in a trough the amount of grain (which should always be finely ground) to add to skim-milk is as follows:—

For young pigs in creep—

At one month—2 lb. grain to 1 gallon milk.
At 6 weeks—2½ lb. grain to 1 gallon milk.
At 8 weeks—3 lb. grain to 1 gallon milk.
At 10 weeks—3½ lb. grain to 1 gallon milk.
At 12 weeks—4 lb. grain to 1 gallon milk.
At 14 weeks—4½ lb. grain to 1 gallon milk.
At 16 weeks—5 lb. grain to 1 gallon milk.

The broadening of the ration as the pig gets older means a bigger supply of carbo-hydrates. Where the automatic feeder is in use, the pig should get a drink of milk twice daily; in addition, there should always be clean drinking water available.

Barley comes first among the grains as a food for producing first class pork or bacon, and in conjunction with skim-milk forms an ideal food. Oats, on account of the large percentage of hull, which is indigestible by the pig, is not advised for pigs under the age of twelve weeks. They, however, produce a good bacon or pork.

Wheat as a food gives fair results. Feeding trials carried out with wheat and barley mixed and wheat alone showed that pigs made quicker gains on the wheat and barley. When killed and dressed and allowed to set, the pigs fed on the wheat and barley mixture showed a firmer fat than did those fed on wheat alone. Peas have a hardening effect on the lean; if fed alone they do not give the best results, but when given in conjunction with grains, in the proportion of 25 to 30 per cent., they help to make a valuable food.

Maize fattens pigs readily, but gives a soft inferior pork and bacon. Pigs fed on maize should be finished off on barley during the last four weeks. However, it would be better, if possible, to feed barley throughout at the rate of 60 per cent. to 40 of maize.

Beans do not produce a first class bacon, and should constitute not more than about 20 per cent. of a ration.

Pollard is perhaps the by-product most used by pig-farmers. Being so finely ground, it is especially suitable for young pigs, but when a pig is fattened on pollard alone the flesh is soft; therefore, other grain should be introduced and fed in conjunction; suitable quantities are set out hereunder—

At 10 weeks—7 parts pollard to 3 parts barley.
At 12 weeks—6 parts pollard to 4 parts barley.
At 14 weeks—5 parts pollard to 5 parts barley.
At 16 weeks—4 parts pollard to 6 parts barley.

At no time should either rice-meal or polly-meal constitute more than 30 per cent. of a ration. Molasses is not a good feed for pigs. If used at all, it should not form more than 10 per cent. of a ration; otherwise it may cause scouring.

Bran is usually fed as a laxative, not as a fattening food, and is given to sows after farrowing to prevent constipation; generally

from 1 to 2 lb. daily will be sufficient for this purpose. When young grass is available it will probably not be found necessary to use bran.

Meat-meal is a protein-rich food containing from 50 to 60 per cent. of that constituent; it is used when no skim-milk is available to add to grains to balance the ration, and may be fed in the following quantities according to the age of the pig:—For young pigs in creep, 12 lb. meat-meal to 100 lb. of grain; at 8 weeks old, 10 lb. meat-meal to 100 lb. grain; at 10 weeks old, 9 lb. meat-meal to 100 lb. grain; at 12 weeks old, 8 lb. meal to 100 lb. grain; at 14 weeks, 7 lb. to 100 lb. grain; at 16 weeks, 6 lb. to 100 lb. grain, and finish off at this amount.

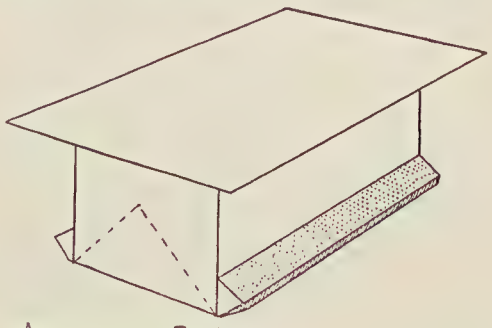
When the grass is dry a little linseed may be added as a laxative. With a good pasture of young succulent clover and grasses, linseed is not necessary, and the percentage of meat-meal may be slightly reduced. All pasture for pigs should be kept on the short side. Young and leafy grass will give the best results. Fibre is almost totally indigestible by pigs; consequently, if the grasses are allowed to run up into stalk and become fibrous they are not of much use for food.

Lucerne is a good pasture for pigs; however, it is advisable to remove them from the field about 2 or 3 weeks prior to marketing, as lucerne tends to produce a soft bacon. They may be kept on grass till they are marketed.

In some cases refuse from restaurants, hotels, and boardinghouses is used for fattening pigs. It is advisable that all such food be boiled. Not only will the food be sterilized in this way, but if the boiled mass be allowed to cool, the fat may be skimmed off and sold. As the carbo-hydrate content of household refuse is usually high, it is well to remove the fat content, otherwise it may cause scouring. A pig fattened on refuse alone produces rather a soft pork or bacon; the addition of grain and meat-meal adds considerably to its feeding value, and improves the quality of the product.

Potatoes are sometimes fed in considerable quantities to pigs. They are improved by cooking; this breaks up the starch granules, and renders digestion easier. It is always advisable to discard the water in which they have been boiled, as the drug solanin contained in the skin of the potato has rather a harmful effect on the young pigs. To get the best results potatoes should be fed with grain or skim-milk—1 lb. grain and a gallon of milk being allowed for every 4 or 5 lb. potatoes. Fed solely on potatoes, pigs fatten slowly, their bones are soft, and sometimes they scour and at times develop an itchy condition of the skin. A sow fed altogether on potatoes without green fodder or milk is liable to abort.

Pigs are quick-growing animals with a comparatively small stomach capacity. Consequently those kept in styes and fed in troughs should be given at least three feeds daily. When only fed twice they become exceedingly hungry, and may perhaps gorge themselves; diarrhoea often follows, sometimes with fatal results. Pigs must not be allowed to become ravenous. They should be given at each feeding as much as they will eat in half an



AUTOMATIC FEEDER — 6' × 3' × 3', *Lid projecting 18" on either side.*

hour. After the mid-day meal fill the water trough; even when getting milk, pigs will usually require drinking water.

Where there are several varieties of grains on a farm they may be mixed, and pigs will fatten quickly on them. If possible, however, barley should preponderate in any mixture during the last month.

In the warmer parts of the State millet is sometimes fed. If fed alone, it will produce a soft flesh. It should at no time form more than 40 per cent. of any mixture.

Discarded raisins may be fed in conjunction with grain and pasture, or grain and meat-meal. Trials have shown that their food value is about one-half that of pollard. It has been ascertained that 7 lb. raisins will produce 1 lb. of pork. In the same experiments it was found that each 3½ lb. pollard consumed by pigs increased their weight by 1 lb.

Farrowing shelters showing automatic feeders at rear.

Fruit, such as wind-fall apples and surplus stocks, is sometimes fed to pigs. It contains a large amount of moisture with a low protein content. Of the fruits usually available, grapes are the most valuable. There is very little difference between the food values of apples and pears. Fruit may be fed liberally to dry pigs running on pasture, but it is inadvisable to feed it in large quantities to fattening pigs—not more than 5 or 6 lb. per day should be allowed each animal. For these the main food should be grain and milk, or grain with meat-meal added.

Breeding sows should not be fat, neither should they be in low condition. If run on pasture they will remain in good store condition, and will keep healthy.

Where sows are kept in styes, they should never be fed only on grain and water. If milk or pasture is not available meat-meal or bone flour should be added to the feed; in the case of meat-meal six parts in 100 is a fair allowance; with bone flour one part in 100 will suffice. When a sow is near farrowing the meat-meal should be increased to 10 per cent., and the bone flour to 2 per cent.

Open-air farrowing is preferred where possible; this will necessitate the use of movable farrowing shelters in small paddocks. Little pigs should never be kept in a dark stye; they should be kept out in the light and open air as soon as possible. They will look for roughage when about three weeks old, and a creep with feed should be provided for them at this age. Young pigs should not be allowed to become "staggy"; to guard against this, castrate them before they are weaned. A pig should be well looked after from the start; the younger he is when fattening begins the less it will cost.

If possible, fatten in small lots—never more than twenty pigs together. When kept in large mobs they require a longer time to fatten. Never place styes or sleeping quarters in gullies or on the sides of banks where there may be draughts. Always provide a shelter which will shield them from the wind and cold rain. Shade in summer is essential. In the hot northern districts of Victoria a wallow will give good results. It need not be very deep—about 16 inches will suffice, and it should contain 9 or 10 inches of water. It should be protected from the sun by a roof—one of straw will do. A small quantity of Little's non-poisonous sheep-dip or crude oil may be added with advantage to the water.

Pigs should be weighed monthly, and a record kept of the litter from each sow. Some sows, like some cows, do not pay for their food, and should be culled. Young pigs should increase at least 1 lb. a day in weight, and be ready for bacon at five months. Short, dumpy pigs will not make good baconers; they should be culled at weaning time, and sold as light porkers; the longer they are kept the less per lb. they will bring.

[Continued on page 294

Bull Index Work

Is the Basis Sound?

By W. J. Yuill, Senior Dairy Supervisor

DURING the post-war period, and, in particular, during the past decade, much research has been carried out in various countries, and a great deal written on the subject of bull index work. Some resentment has been shown by breeders, studmasters, and farmers towards those they speak of as experimenters and scientific meddlers, who are intruding into the domain of the genuine breeder of live stock, though, as a matter of fact, their investigations reveal facts of the greatest value to the breeder.

Despite much criticism and organized opposition, wide interest is developing in this work, and what are termed Bull Proving Associations have been formed in some countries. When discussing the question, it is necessary to bear in mind that the basis of the work is a comparison of the milk yield and butter-fat test of the mates and daughters of a herd sire with those of their dams. This, of course, presupposes that some system of herd recording work has been in operation long enough to obtain figures that will flatten out inequalities, due to seasonal influences and other factors affecting production records. This aspect of indexing work will be discussed later. Much development in cattle breeding took place prior to the middle of the seventeenth century, when the work of Robert Bakewell, an English farmer, marked an era of organized stock breeding previously unknown.

His experiments with Longhorn cattle, also with horses, sheep, and swine began with the purchase of the best that could be secured within the breeds. From then on, Bakewell relied on selection and the closest mating to secure breed development, and so successful was he that he is regarded as the greatest breeder of all times.

The makers of the Shorthorn, Hereford, Aberdeen Angus, and, indeed, most of the breeds of live stock, have more or less followed Bakewell's methods.

In 1820, the first Breed Societies' stock register was brought out by Mr. Geo. Coates. This contained a list of selected pure-bred Beef Shorthorn stock in the country. Herd books of the dairy breeds did not appear until much later.

The great master breeders of the beef breeds, viz., Bakewell with Longhorns; the Booths, Bates, Colling Bros., and later, Cruickshank, with the Shorthorns; Watson, with the Aberdeen Angus, and other men not quite so well-known, had a definite advantage over the improvers of the dairy breeds. They worked with "seeable" characters that could be observed at any time; characteristics such as early maturity, high digestive capacity, and ability to lay on beef in desirable places, could all be easily detected; so, too, could the faults of conformation, which were ever before the eye. The improvers of the dual purpose cattle, and the purely dairy breeds, however, were faced with much greater difficulties, for to ascertain the production character of any animal, a knowledge of her yield was essential to securing satisfactory data.

Prior to the introduction of organized herd-testing in 1895, as we know it to-day, there was much effort expended in an endeavour to ascertain the production of dairy cows. Aiton, who made an early survey of the Ayrshire breed, speaks of cows making from 800 to 900 gallons annually. This was prior to the eighteenth century. Professor Boutflour tells of records of a whole herd, averaging up to 5 gallons daily, individual cows to 8 gallons a day, and of one cow whose six years' average was 1,285 gallons. This was during the years 1805 to 1811.

Great breeders have worked on individual herds in all countries. Many and varied methods were recommended for the development of the dairy cow. Gradually the belief has been formed that the measure of a good dairy cow is her own record of production, and that the only useful test of a herd sire is a statement of the influence that he transmits to his daughters. The one can be known only by some system of herd recording, the other by some form of "bull proving" or indexing.

Just as herd recording was coldly received by many breeders and farmers, and is still totally ignored by others, so the newer idea of judging dairy bulls on an index of their known breeding ability, rather than external appearance, is meeting much opposition.

What Lord Lymington describes as "£20 results from £2,000 bulls" has made dairy farmers and breeders desire to foretell with some degree of certainty what a new herd sire's influence will be.

Despite the indifference of the average stud-master, the methods of fortelling the probable breeding worth of a bull are definitely developing.

Speaking on this subject recently, Professor Boutflour said:—"A bull index as devised by Mount Hope farm is of more value than a cow's record. There are two essentials needed when breeding better dairy cattle—

(1) A sincere standard of excellence in breeding for dairy quality.
(2) There must be the use of proved bulls, whose indices are known."

Mr. O. E. Reid, dairy chief of America, says:—"It may be satisfactory to select bulls for low-producing herds on the strength of their pedigree and type, but for herds of more than 300 lb. of butter-fat only 'proved bulls' that have demonstrated their ability to increase production in such herds should be used. It is not 'typy' or even 'pedigreed' bulls that are needed, as much as 'proved' bulls."

Havelock of Darbalara. A noted sire in the Willow Park Stud.

Methods of Bull Proving.

Professor V. A. Rice, of Massachusetts Agricultural College, says:—"Herd recording was designed to find the unproductive cow. Replacement, however, has been difficult. Science and practice suggest that this can best be done by means of a proved bull programme."

He also says—"A bull's general appearance as a guide to his breeding worth is unsatisfactory. A bull's pedigree, while admittedly superior to the first method, is also far from satisfactory or accurate. Young bulls of good type and pedigree should be selected and put to the only real test of a breeding dairy sire, viz., *a comparison of the production records of his mates and their daughters.*"

In the 1930 American Bluebook, J. C. MacDonald says:—"The newer idea of retaining older animals for breeding work is a result of studies made by geneticists and animal breeding experts, who have found that the external appearance has little value in determining the characters that will be transmitted to the progeny."

Mr. G. Haines, in 1931, says:—"All the experiments dealing with the inheritance of production characters have indicated that the only measure of ability to transmit desirable characters to the progeny must depend on records of production of the progeny."

Danish authorities affirm, after extended and extensive research, that the only worth-while measure of a dairy bull is gained by a comparison of the production records of his daughters with those of their mothers, and his value is indicated by the extent to which he can influence his daughters for higher yields.

Can a Dairy Bull be selected on Type?

When the "Mount Hope Index" was made on twelve of the leading Friesian show bulls of South Africa, it was found that the mass records of their 109 daughters which had tested dams averaged 100 gallons lower than those of their dams.

Professor Scott Watson, of Oxford, England, speaking to the members of the Young Farmers' Club, at Cheshire, on the subject of judging a dairy cow, said, "None of the characters that could be measured, such as deep middle, width of hind quarters, milk veins, udder size, wide muzzle and forehead, fine bone, neat shoulders, long tail, and escutcheon were found to be correlated to production. The investigation showed that a milking pedigree was more important than appearance, and, judging by the score card, was more important than measurement of specific points of the animal."

Type, pedigree, and function are not found to be correlated. It is the common experience of a great number of herd-testing farmers, and of those whose work it is to visit stud farms, as well as those who inspect commercial dairy cows, to see all three features in some cows, and only one in others. A registered cow may lack productive ability and type; or she may be registered, and be a high producer and lack type; or she may be registered and be of good type, yet lack productive ability.

On the other hand, many nondescript cows in our commercial herds that are wonderful "machines" in milk making, are not only producers, but also reproducers of this kind.

There are, of course, numbers of the class we all admire, for beauty and symmetry of form that fulfil all expectations as producers.

Pure-bred enthusiasts inquire: Where do the farmers get all their good dairy cows from? Do we not breed the bulls that they are using? The answer very definitely is that the good cows are of similar breeding to a very great number of bad ones. It must not be forgotten that unusually high producing herds have been bred from nondescript bulls, although by far the great majority of our fine herds have been bred—not from pure-bred sires—*but from selected production-bred pure bulls.*

Dr. Goodall, formerly professor in genetics at the Agricultural College, Massachusetts, and now in charge of the Mount Hope Farm, says:—"It is impossible to foretell the future value of an individual untested animal. A bull, of whose parents only one has a high index, is, so far as production goes, only a half-breed. Many are of a much lower fraction than this. Some are to be found that came from parents pure on both sides. On these bulls the breed depends."

Other authorities say that an animal may be pure-bred for breed characteristics, but be cross-bred for the essential production character, or any other character. It is well known that some of the leading animals of the breeds have been homozygous for serious defects of conformation—veritable "scrubs" in some particular units of character. It may have been an "overshot jaw," a ewe neck, swampy back, drooping rump, pendulous udder, or some other equally undesirable trait, or it may be a much worse character, viz., that of an unprofitable producer. In any of these features, a cow may be cross-bred, although a fully registered cow.

A registered pedigree may be of great value, or it may be worthless. Beauty of form, i.e., "type" is to be appreciated for its own sake, but there is surely no logical reason why any one should forget that *form and function have never been found to be correlated to an appreciable extent by any investigation.*

Strong opinions are expressed by some followers of the "type" school. They say that if type is lost, production will surely follow. The rational deduction of this argument then is that when we find a good producer, we find a good typical dairy cow.

Dominion Oakwood. Sire of many great producers.

The truth is that cattlemen love a typical cow for her beauty and symmetry of form; but every herd-testing dairyman knows that an ugly animal may be a good producer, while many a beautiful cow is a duffer.

Dr. R. R. Greaves, specialist in cattle breeding, says:—"Since we know that inheritance governing all characteristics is transmitted through the germ plasm, it does not seem possible to tell by the appearance of an animal what his inheritance for production is. We do know by hard experience that the production of a cow is not a sure guide to the production of her daughter; and that the production of a sire's dam is often no index at all to the production of a sire's daughters."

Can a Dairy Bull be selected on Pedigree and Type?

To some people the term "pedigree" is almost a magic word, and they think that if they could only secure a pedigreed bull, they would be well on the way to breeding a good dairy herd.

As great an authority as Professor E. L. Anthony, of the Michigan Agricultural College, writes:—"It is the generally accepted opinion that the present method of registering cattle in the United States of America is fundamentally unsound in its basic principle in that, because a sire and dam of a calf may be pure-bred and registered, it follows that the calf is also qualified for registration, and worthy to be used for breed development. Such a system continues in ever-increasing numbers to propagate and carry on undesirable animals, thereby lessening the value of the registration of all animals. The system is genetically unsound, and is one of the greatest drags to breed improvement that can possibly be practised."

Professor R. Boutflour, of the Royal Agricultural College, Cirencester, England, has said

A Friesian Sire.

A Typical Shorthorn.

that, after studying 300 books in the college, he concludes quite definitely that the dairy cows of England have not improved during the past 150 years; they have probably become worse. The result of a century and a half of pedigree breeding and showing, and the expenditure of millions of pounds was that they had a lot of pedigreed cattle which gave less milk than their non-pedigreed sisters.

McCandish and Kay, of the West Scotland Agricultural College, state that 795 daughters of 79 sires lacked an average of 369 lb. of milk. When compared with their dams, only 33 per cent. of the bulls had sired daughters whose milk yield was higher than that of their dams.

Thos. Scott, of Ashburton, England, says:—"It is common knowledge that a registered pedigree is no sort of guarantee that a cow is capable of producing profitably, or that a bull inherits, or is capable of transmitting to his daughters, a high propensity for production."

Are the Pure Breeds Improving?

It is commonly believed that the various breeds are continually making progress, and breed society propagandists contend that the production level of the breeds is rising.

In his book on *Milk Secretion*, Dr. J. Gowan says that this progress is more apparent than real if the breed, as a whole, be taken into consideration. He adds that it is highly probable that selected progenitors of our breeds, had conditions been suitable, would have made records comparable with those of to-day.

Aiton, who was a farmer in the Cunningham district, and knew the Ayrshire breed as far

back as 1766, states that there were cows producing from 6 to 7 gallons a day for several weeks after calving, and up to 900 gallons a year. This was nearly 170 years ago, when we may assume that rearing and feeding cows for milk production was not understood as it is now.

A survey of the registered Guernseys in the Herd Recording Associations of Vermont and Wisconsin, in America, showed that their average production was lower than that of all tested cows.

Writing on this subject in 1931, Lord Lymington said that there had been no conspicuous improvement in cattle breeding since the days of Bakewell. He considered that the comparative inefficiency of our present live stock had been obscured by the enormous improvement in the knowledge of feeding due to men like Mackintosh, of Reading, and Boutflour, of Cirencester. He thought some farmers were forsaking pedigreed stock, and too often they heard the opinion that inheritance is a will-o-the-wisp.

Professor Davenport has said, "In all probability there are never living in any breed as many as a score of animals that produce anything like a positive advance to the breed."

After his extensive survey of the South Devon breed (the largest milk recording society in England), Mr. Thos. Scott found that of 111 bulls that had both tested mates and daughters, 75 per cent. were of little credit to the breed. Only 26 bulls improved the milk yields in the herds in which they were used.

This investigation showed three definite features—

(1) That there appeared to be no system in the selection of herd sires.
(2) The bull indices indicated that the average breeding herd sire was well below the standard of the cows.
(3) It was evident that the breeding cows were selected on production, while no system existed in selecting bulls.

More than 60 years ago, Professor Coleman, who then held the position now occupied by Professor Boutflour, said, "If a farmer buys a bull simply because he has a *pedigree*, and is a bull—without taking into consideration the milking qualities of the family he springs from, he does not deserve to be lucky. Further, if farmers considered this more when purchasing bulls, breeders would then have to give more attention to the milking qualities of their stock."

Mr. O. E. Reid, Chief of the American Bureau of Dairy Industry, says that the first step towards the improvement of dairy cattle is taken when we learn that we cannot rely on a bull because he is registered, and must find one with a good index.

Indices and indexing work will be discussed in a subsequent issue of this *Journal*.

Pig Rearing

(*Continued from page* 289).

Pigs should always have access to clean drinking water. The most economical way of supplying mineral matter is by charcoal and ashes. They may be kept free from vermin by rubbing them with waste oil; oil from the motor may be used.

When a pig attains the weight required by the curer, and is in good condition, it should be marketed, even though the market is dull. It is a mistake to wait for prices to rise; a pig may lessen in value, for there is no sale for over-fat bacon.

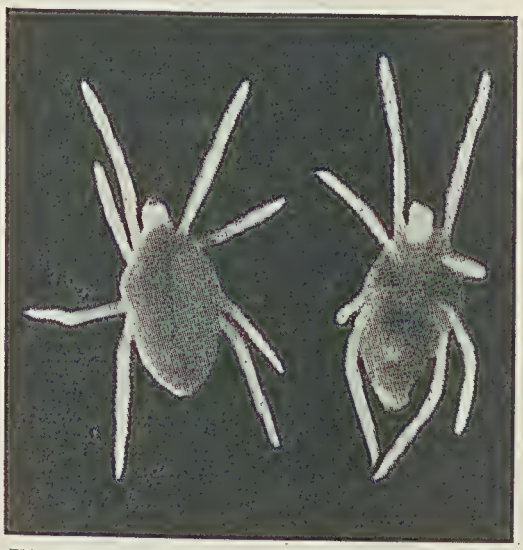
The sow should earn as much as the cow on the farm. There are possibilities for the pig industry in our State, but maybe those possibilities will not be attained until a policy of grading pigs and grading bacon is adopted. Payment according to the grade of a pig will ensure the farmer receiving the highest price for animals of the best quality, while the grading and marking of bacon will ensure the consumer getting exactly the sort of bacon he desires.

The Pea Mite and Red Legged Earth Mite

By R. T. M. Pescott, M.Agr.Sc., Entomologist.

FOR many years pastures and vegetable crops have been subject to the ravages of small bluish-black mites, which, until recently, have been known in Victoria as Pea Mite. However, an examination of a number of specimens of these mites from various districts has revealed the presence of two distinct species. These are the true Pea Mite or Blue Oat Mite (*Penthaleus bicolor* Frogg.) and the Red Legged Earth Mite (*Halotydeus destructor* Jack.). These two species vary in their relative numbers according to the particular districts concerned, e.g., in the areas close to Melbourne the true Pea Mite seems to be predominant, whilst in the Western District the Red Legged Earth Mite is the more numerous.

The Pea Mite or Blue Oat Mite (*Penthaleus bicolor* Frogg.) was first described from New South Wales by Froggatt in 1921, where it was found to be doing damage to young oat crops in the Delungra district. In 1917, a similar mite was recorded from the Bunbury district in Western Australia, where complaints were made that "red spider" was destroying potato and vegetable crops in that area. It was thought, later, that this mite was identical with the Blue Oat Mite of New South Wales, but subsequent observations have shown that the species concerned was the true Red Legged Earth Mite (*Halotydeus destructor* Jack.) Since that time this mite has spread throughout South Australia and Victoria, and has been recorded from New South Wales and Federal Capital Territory. Both of the above species are known in South Africa, and it is almost certain that the Red Legged Earth Mite was introduced into Western Australia shortly prior to 1917, from South Africa, where it is spoken of as the Black Sand Mite.



The Red Legged Earth Mite (adult female).
Left.—Dorsal view. Right.—Ventral view. Magnified by 20.

The main points by which the two species may be distinguished in the field are as follow:—

The Pea Mite (*Penthaleus bicolor* Frogg.)—body rather globular; legs bright red; general colour of body black with a reddish patch on upper surface.

The Red Legged Earth Mite (*Halotydeus destructor* Jack.)—body not so globular as Pea Mite; entirely black without reddish patch; legs not so red as in previous species.

Plants Attacked.

These mites are usually found early in the season swarming and feeding on several types of introduced weeds, most commonly on Cape Weed (*Cryptostemma*

calendulaceum) and the two common Chickweeds (*Stellaria media* and *Cerastium vulgare*). Other weeds are attacked to a lesser degree. From these plants, the mites swarm to most of the autumn and early winter-grown seedlings, whilst in the vegetable garden lettuce, red and silver beet, potatoes, peas, pumpkins, melons, carrots, and turnips are very severely attacked. Among crops, oats, lucerne, and all clovers, particularly Subterranean Clover, are most severely attacked, while wheat and barley are occasionally damaged, particularly when the plants have received an early check in their growth. These mites must not be confused with

Leaf showing typical injury caused by mite.
[W.A. Department of Agric.]

the Red Spider and Bryobia Mite which are commonly found on fruit trees—the Earth Mites do not climb trees or other plants which grow to any size, being confined to low-growing vegetation.

The mouth parts of these mites are developed more for rasping than for piercing. The surface of the leaf is broken and the sap sucked up. This results in a silvery or bleached area on the plant attacked, and where the mites are numerous and the bleached areas large, plants, and particularly young ones, cannot stand up to the loss of sap, and consequently die. Once the plant is making strong growth, however, the mites do not appear to do severe damage. The most severe general damage probably is done when the mites are working over large areas of pasture early in the season. Growers rely to a great extent on early winter feed from pastures, but, where the mite is in large numbers, this early growth may be entirely checked with the consequent loss of the early winter feed. Later, however, providing the plants have withstood the early attack, they grow away from this trouble, and good late crops result.

Life History.

The mites make their appearance early in April, usually shortly after the autumn rains. At that time, eggs, which were laid towards the end of November, commence to hatch out, and myriads of small six-legged mites are to be found. The fact that the mites are able to exist over the hot summer months in the form of an egg is not generally recognized. The summer eggs are laid by the thousands about the surface of the soil, under clods, dry weeds, or rubbish. These eggs are extremely resistant to heat, drought, and desiccating winds, although some are always destroyed under these conditions. Moisture and mild warmth such as exist in early autumn are necessary for the hatching of these summer eggs. Later in the winter, the then fully-grown mites lay their eggs either on the soil or on the leaves of food plants, and these hatch over a period of from seven to fourteen days, depending mainly on weather conditions. The young mites hatching from these eggs are small, six-legged, and with dull-red bodies. After several moults or sheddings of the skin which may occupy a period up to 40 days, they become fully grown, adult mites. In this stage, the mite measures about 1-25 of an inch in length, with the body of a dense velvety black colour and with eight red legs. They are capable of very rapid motion over the ground. There are several generations or broods of these mites in a year.

Control Measures.

Measures for the control of these mites may be classed under two distinct headings—(*a*) Preventive, and (*b*) Chemical.

(*a*) *Preventive Measures.*—Preventive measures may be applied by growers of vegetable and garden plants, and also by pastoralists with large areas of grazing land. The small grower should not trade in seedlings or cuttings from known infested gardens. This is a very easy means of spreading the pest, as the eggs of the mite are laid on the leaves of the plant, and hatch out in several days in their new environment and commence new infestations. Over large areas of pastures other measures are recommended. Burning off of

grass or clover lands destroys the over-summering eggs. Generally speaking, however, this is not possible, as the food is required to carry the stock through to the autumn, when the young growth makes its appearance, and by that time there is not sufficient dry material left to give a satisfactory burn. Where practicable, fallowing the ground every three or four years is helpful. It takes three or four years for the mites to reach numbers in which they will do severe damage after a paddock has become infected. By turning over and burying the swards deeply before the grasses and clovers have died off, the mites will be destroyed before they have a chance to produce their summer eggs. After plowing, the ground should be worked down to a fine tilth, and any subsequent growth of weeds or clovers on the fallow kept suppressed.

Another method is to allow the mites' eggs to hatch in the autumn, and to turn them in thoroughly before sowing the crop. Clean fallow throughout the early spring and summer will guarantee freedom from the pest at the time of sowing. Any later trouble can come only from an invasion from outside areas, such as dirty or weedy headlands. This can be overcome by burning off in the spring as soon as the growth will carry a fire.

(*b*) *Chemical Measures.* — Most chemical measures for the control of insect pests are costly, and can be used only when the crop is one of high value per acre. This is the case with these mites, and, as a rule, only the vegetable and flower grower will find that it pays to use sprays and dusts for the control of this pest. A method which many market gardeners have practised with success is to place a "ring" of creosote right around the fence of the paddock. This consists of a narrow strip (about 3 inches wide) of creosote, which is produced by partially flattening the end of the spout of a watering can containing the creosote. It is found that, providing the "ring" remains unbroken, the mites will not cross it for a period ranging from four to six weeks. Thus, any possible reinfestation from outside is prevented. It thus becomes necessary, then, to destroy those mites that are enclosed in the field to prevent their breeding up in large numbers. This can be accomplished by using any of the following sprays or dusts.

A suitable powder can be prepared by mixing together thoroughly 1 lb. of 15 per cent. carbolic powder and 4 lb. of superphosphate. This should be broadcast by hand over the affected area, or, in the case of large pastures, spread out with an ordinary farm drill or artificial manure spreader. To be effective, 1–1½ cwt. per acre should be applied. This material serves a double purpose. It has previously been stated that a plant growing freely is less subject to attack than one which is slow growing. The manure in the above material, while acting as a spreader for the carbolic powder (which actually destroys the mites) stimulates plant growth, thus increasing the resistance of the plant to attack. This dust should be applied between 11 a.m. and sundown on warm days. The mite does not become active until the foliage has become dry, and, if the dust is applied to wet foliage, the greater part of its effectiveness is lost, owing to it caking on the leaves. To obtain the maximum results, the mixture should be applied to the plants about a fortnight after the main autumn rains, so as to kill the young mites before they have time to do any serious damage.

Tobacco dust (Pestend) and lime in equal quantities, and Clift's manurial insecticide also have proved successful when applied at the rate of 1–1½ cwt. per acre.

Another dusting powder which gives good results is made up by mixing half a kerosene tin of tobacco dust, a similar quantity of lime and half a pint of kerosene. The kerosene should be added to the lime and allowed to stand overnight, when the tobacco is added, and the whole mass thoroughly mixed. This is applied in the same manner as the other dusts.

For spray purposes, the materials recommended are nicotine sulphate or black leaf 40, 1 lb. to 80 gallons of water, to which 3 lb. of soap is added. The soap is shredded and dissolved in boiling water and then stirred into the bulk. This is a contact wash, and kills only those mites with which it comes into contact. Another suitable spray is kerosene emulsion, which may be made from 2 gallons of kerosene, ½ lb. of soap, and ½ oz. naphthalene. Dissolve the naphthalene in the kerosene, and boil the soap in 1 gallon of water. When boiling, remove to another vessel, add the kerosene and naphthalene and churn violently for ten minutes. This will form a creamy mass, which thickens on cooling. This makes a stock solution, one part of which should be diluted with eight to ten parts of water for use as a spray.

Court-Noué—A Mysterious Vine Disease

New Light on an Old Enigma

By Francois de Castella, Viticulturist

FOR many years past the curious vine disease known in France as Court-Noué has baffled vinegrowers and pathologists, investigations as to its cause and control having, until quite recently, proved fruitless.

But the puzzle seems to have been solved at last by Viala and Marsais, who, in a recent communication to the French *Académie des Sciences,* suggest as the most probable cause of Court-Noué, a new fungus which they have named *Pumilus Medullae.*

The disease has long been known in Southern France. It was mentioned by Rozier as far back as 1780. Until comparatively recently, its manifestations have been of sporadic nature, only a few scattered vines in a vineyard being affected. Latterly, however, its seriousness has steadily increased, and in some regions of France, affected vines occur in groups or patches, sufficiently numerous to curtail the yield of many vineyards. In a few cases it has even assumed disastrous intensity.

Court-Noué is not confined to France. It is known in other parts of Europe under different names, such as *Mal Nero* in Italy, *Marromba* in Portugal, and *Raisig-Krankheit* in Germany. In certain French districts it is also known by other names, such as *Roncet* in Burgundy, *Vigne Persillée* (parsley-leaved vine), and *Jauberdat* in Aude Department, &c.

Nor is it unknown in Australia, though presenting as yet so little gravity as to largely escape attention. It would seem that the "rogue" vines occasionally met with in some of our vineyards, that sprout late in spring, lose their crop through *coulure* at blossom, and later in the season, present a characteristic and somewhat abnormal appearance, are cases of Court-Noué. In some Westralian vineyards, indeed, these morbid symptoms are alarmingly prevalent.

In Australian vineyards, affected vines often recover after a few years. In Europe, recovery is much less frequent; the vines get gradually worse, many ultimately dying. This difference is probably due to climatic reasons.

According to Bioletti, the vine disease known in California as "Little Leaf" would seem to be akin to Court-Noué (see *Journal of Agricultural Research, Washington,* U.S.A., 6th March, 1917).

Symptoms of the Disease.

The French term Court-Noué (meaning literally "short knotted") very fittingly describes the disease, for a marked shortening of the internodes, especially near the base of the cane, is a salient feature. The canes often have a peculiar zig-zag appearance, the internodes sloping alternately in opposite directions. Other symptoms, according to Gauch and Durand* are:—

(1) Slowness of growth after bud burst in spring; (2) *coulure,* such that an abundant "show" of fruit is reduced to bunches with only a few scattered berries on each; (3) a late start of growth, as the weather becomes warmer. Though the basal internodes are much shortened, those further out show almost normal development; and (4) the emission of numerous secondary canes or laterals; in other words, a shrubby growth habit.

This morbid condition may remain stationary, but it usually becomes worse, though in some cases it is capable of improvement. Though usually persistent, it is not inconsistent with a long life of the affected vine. In most cases a few vines are affected at first, but the disease tends to spread in patches, which may finally invade the whole, or only a definite portion of the block of vines.

Other less constant symptoms are fasciation, malformation, distortion, variegation, and bleaching of foliage; leaf dentition is usually exaggerated, the

* Report of the Court-Noué Committee, to the Societé Départementale d'Encouragement a l'Agriculture de l'Herault—29th January, 1924. See Progrès Agricole, 30th March, 1924.

terminal tooth of each lobe being longer and sharper, giving the leaf a characteristic fingered or even "parsley" appearance.

Growth is abnormally prolonged until very late in autumn or early winter.

Internal lesions are often noted in pith, bark, and bast. They consist of brown patches, or groups of more or less disorganized cells, though no bacteria are to be found in them.

The disease under consideration must not be confounded with that formerly also known in Switzerland under the same name of Court-Noué. The two are altogether distinct, though a marked shortening of the basal internodes is common to both. The Swiss form is caused by a miscroscopic mite (*Phytoptus Vitis*) seemingly identical with that causing Erinose, though the outward manifestations are very different. To avoid confusion, the Swiss form of Court-Noué is now called Acariose.*

Contagious but not Infectious.

Though the disease spreads slowly, its contagious nature has long been recognized in Europe, and the taking of cuttings from affected vines is avoided.

According to Ravaz†, a diseased scion will contaminate the stock it is grafted on. Conversely, a healthy scion grafted on an affected stock soon shows the characteristic symptoms. The soil may become infected; if a Court-Noué patch in a vineyard be rooted up and replanted, the young vines soon show symptoms of disease. In pot culture, healthy vines planted in infected soil are soon affected. A healthy vine in healthy soil can be infected by adding to the pot a handful of contaminated soil, or a few roots from a diseased vine. Contaminated soil can, however, be sterilized by heat (110° to 120°C.), or by a disinfectant such as formol. Healthy vines potted in soil thus treated remain healthy.

But the spread of the disease from vine to vine in a vineyard is usually very slow. Ravaz mentions several examples. In one case, a new vineyard was established on the site of an old one in which there was a Court-Noué patch. This patch reappeared in the new vineyard, but, after 30 years, it had only spread to the extent of a few vines. As with leprosy in humans, contagion is very slow, unless under most favorable conditions. In this respect Court-Noué differs altogether from highly infectious diseases, such as Downy Mildew, or even Phylloxera.

Conditions Favouring and Hindering the Disease.

According to Gauch and Durand, Court-Noué is more prevalent and more intense under the following conditions:—

On low-lying land of a stiff, clayey, cold nature, which becomes too wet at times. Vines planted too deep. Vines that are deeply tilled. Vines planted on land that had previously been planted with Jacquez‡, either grafted or on its own roots. Early sprouting sorts (in early spring) are more susceptible, as are also sorts that continue to grow late in autumn (Servan, for example). Stocks with plunging roots, such as Rupestris and its hybrids. A cold spell after the start of growth. Spring frosts or a spring that is showery and cold. Lastly, vineyards on good soil that yield heavy crops and that are thoroughly tilled.

Court-Noué is on the other hand less frequent—

In the higher parts of vineyards where drainage is good. Vines planted shallow. Virgin land, or land previously under vines, but that has since grown several cereal crops. Vines that are only tilled to a shallow depth. On stocks that have a shallow root system. In seasons with a warm spring with little rain. Vines that do not yield heavily, and are badly tilled. Vines interplanted with fruit trees, and also closely planted vines. Where hard pruning and disbudding reduce vegetative growth.

The disease attacks vinifera sorts on their own roots as well as those grafted on resistant stocks. The trouble is more widespread in Europe since reconstitution, but this is not owing to greater susceptibility of the American vine. One of the worst cases I have seen in Australia was in a small vineyard near Lilydale where the vines (Folle) were on their own roots.

Some phylloxera-resistant stocks have long been considered resistant to Court-Noué. They suffer less than others. The Berlandieri hybrids, and No. 333 in particular, are in this category.

Earlier Conjectures.

There has sometimes been confusion between Court-Noué and other vine troubles, which were wrongly attributed to it, though they were really cases of quite distinct diseases, such as *Esca, Gelivure,* and *Excoriose*§; but true Court-Noué has hitherto proved a baffling problem, despite very thorough investigation. In the

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* During the last few years, some manifestations that seem to be true cases of *Acariose*, have been observed in the Mildura and Swan Hill districts.

† Progrès Agricole, 28th January, 1934.

‡ Jacquez or Lenoir—is a hybrid vine at one time largely used as a resistant stock and also as a direct producer.

§ *Esca* is the name now given to what was formerly known as apoplexy, owing to the sudden death of affected vines. It is caused by a tinder forming bracket fungus *Stereum necator.* It is controlled and can even be cured by spraying the vine in winter with a ½ per cent. solution of sodium arsenite. In California it is known as "black measles."

Gelivure is a bacterial vine disease. There is some confusion here, some authors consider the Italian *Mal nero* to be *Gelivure*; others look upon it as identical with true Court-Noué.

Excoriose is a disease affecting the young canes and also the buds of the vine. It is caused by a fungus *Phoma Flaccida.*

absence of positive evidence to the contrary, it had come to be regarded as an abnormal physiological condition rather than a disease in the strict sense. The subject is treated briefly in most text-books, but a vast amount of literature concerning it has appeared in French viticultural periodicals during the past twenty years. Little of a tangible nature can, however, be learnt from its perusal. Many explanations have been suggested. Its definitely contagious nature, together with the absence of a visible causative organism, would seem to indicate a virus, and this has been considered the cause by many. Others have looked upon it as a disease due to impoverishment, but this is scarcely compatible with its frequent appearance in vineyards on rich soil that are thoroughly tilled and generously manured. It is most common where the sub-soil is compact and badly drained—liming, to flocculate clays, and drainage, have proved useful palliatives. The swabbing of pruning wounds with coal tar was claimed at one time to be a cure. Though improvement was reported in some cases, the tar treatment did not come into general use. Fumigation by burning sulphur under a tub or cylinder, inverted over the vine, as is sometimes done for the control of Pyrale and Cochilis (Tortrix caterpillars allied to our Light Brown Apple Moth), seems more effective, though not a complete cure.

It is true that some authorities have noted the presence of organisms in affected vines, notably Petri, at the Rome Vegetable Pathology Station, Rives and Ranghiano. Rives* attributes the disease to an abnormal development of *endotropic mycorhiza.* These organisms, which are normally present on, and, indeed, useful to the vine, would thus in excessive numbers become positively injurious. Ranghiano† also found organisms somewhat similar to those described by Rives, in the buds and leaves of affected vines. In his opinion, a weakening of the vine, which might be due to various causes, would upset the equilibrium between the vine and the mycelium, so that what would normally be symbiosis, would become parasitism.

Viala and Marsais' Recent Communication.

The foregoing is by way of introduction to a brief account of the most recent discovery in connexion with this evasive disease, in order that its importance may be better realized.

Viala and Marsais point out in their communication‡ that Court Noué of the canes can be provoked by various parasitic causes, some of which have been specified, as in the case of *Stereum Necator,* the cause of the disease known as *Esca.* The most frequent cases of Court-Noué are, however, due to the action of *Pumilus Medullae.* They proceed to explain that this communication is a preliminary one, to record the date of results obtained in the study of this grave disorder, which was previously attributed to divers causes (physiological, Mycorhyza, Endophytic root mycelium, bacteria, filterable virus, &c.).

Court-Noué has disconcerted numerous investigators, who have involuntarily overlooked the internal lesions of the disease, which are, nevertheless, very characteristic and easily detected.

These lesions exist solely in the trunk. If the stems are split through the centre, from the arms to the roots, they can always be found, very distinct and well developed. Their constancy has struck us during several years in all the vineyard regions of France, Algeria, and abroad, where we have been able to study them. The evil seems widespread in the vineyards of the whole world, with a gravity, sometimes disastrous, but always important, though not epidemic like mildew or phylloxera. Court-Noué is most often limited, spreading fairly slowly around the points first invaded. Its continuance or its reappearance are constant in a soil that has previously been contaminated. Its spread is possible by the planting of cuttings or by grafting, since the parasitic cause of the disease lives in soil, cutting, or scion.

The most characteristic lesions are situated within the stem; the young pith is first invaded; it is modified and blackened to such an extent that, instead of disappearing through compression by the wood, as it normally does in the course of one, two, or three years, it becomes persistent, constituting a black trail, widening downwards to the heel, where it is open to the soil. In the early stages the septa of the cane (now become stem) seem only slightly attacked; in stems three to four years old they are destroyed, the lesion forming a continuous black band, which shows up distinctly against the normal whitish wood.

This primary lesion spreads around the pith, connecting with pruning scars, where the invasion mostly commences in cases where it only shows up later than the first pruning; thence other lesions reach, by way of the medullary rays, the bast and the wood, large patches of which become blackened. The parasite sometimes reaches by way of the dead wood of pruning wounds the outside of the stem, where it destroys the bast tissues; it spreads, producing large cankers characteristic of this, the gravest form of Court-Noué."

A detailed description follows of the abundant mycelium characteristic of the fungus *Pumilus medullae,* which has been isolated in

* L. Rives, in *Revue de Viticulture,* 13th and 20th December, 1923.
† D. Ranghiano, in *Revue de Viticulture,* 18th August, 1932.
‡ *Comptes Rendus de L'Académie des Sciences,* 1934, p. 25. 3rd January, 1934.

a pure state, and cultivated, during the past two years. It has thus been possible to follow its rather complicated development.

It is dark-brown, almost black, in the vine lesions, with many much paler branches that are always septate. In cultures, it is at first snow-white, darkening with age to brownish-grey or black. Two kinds of Mycelium (*Macrohyphae* and *Microhyphae*) are constant, varying in diameter from 1.5 to 5μ, but intermediate sizes are frequent. The mycelium is very septate; its cell content is homogenous and without vacuoles; it penetrates agar and sterilized potato, which it completely destroys.

Neither in nature nor in cultures has any conidial reproduction form been observed. It is held that the hyphae of small to medium diameter multiply by segmentation into numerous fragments. It is in this way that culture media have been inoculated. Multiplication may also occur by unicellular fragmentation of the Macrohyphae to produce Oïdia of large size.

Pycnidia occur rarely on the vine, in pith and medullary rays. They are more frequent in laboratory cultures, and contain numerous spores which germinate readily, immediately giving rise to the various mycelial forms. They are often compound, hard, and black, and result from the agglomeration of several smaller ones.

Further particulars are promised in a later memoir concerning the biology of *Pumilus medullae*. Infection tests proving the pathogenic nature of the fungus will be awaited with interest. This parasite, of which the ascospore stage has yet to be found, belongs to the Sphaerioideae group of Sacardo. It might be referred to the genus *Piptostomum*.

In artificial cultures, the fungus has proved susceptible to arsenical solutions of low strength (1 per 1,000); this augurs well as regards control, which may be practicable on similar lines to that now successfully applied against *Esca* (*Stereum necator*) in France and in California.

Commenting on these recent views, Ravaz (*Progrès Agricole*, 24th Jan., 1934), suggests such preventive measures as soil disinfection (CS_2, Formol, Hypochlorite, &c.) when infected patches are replanted; mounding the young grafts with sterile sand; swabbing the pruning wounds on young vines with an antiseptic, or with coal tar.

It will be gathered from the foregoing that Viala and Marsais' recent investigations constitute a notable advance in the study of this hitherto obscure vine disease; one which, though as yet ignored by most of our vine-growers, might become as grave a menace here as it now is in southern France.

For many years it was comparatively harmless in that country. The small Lillydale vineyard, referred to above, which has since been uprooted, was seriously affected. Western Australian experience also shows that the disease can develop under Australian conditions. Selection of cuttings or scions is always desirable. In taking these, "rogue" vines should be carefully avoided. Court-Noué is a potential vine evil that it would be unwise for us to ignore.

Orchard and Garden Notes

By Edward E. Pescott, F.L.S.

The Flower Garden.

THE time has arrived for tree planting—a very important operation in the country. There are two reasons for planting trees —first, for ornamental purposes; and, second, for farm and stock shelter. The first aspect will be here considered. The trees themselves are the argument in favour of planting, and the home surroundings are greatly improved by beautiful trees.

The general decorative effect of a tree is one important point. The charm of the golden, the Lombardy, or the Bolleana poplars is undeniable. These add great beauty, both of form and of colour of leaf, to any garden. The pin oak, decorative all the year, gives a brilliancy of red in autumn, which ranks it as one of the best of autumn foliage trees.

Among evergreen trees, some good species are the Cape chestnut and the currajong. Both are somewhat slow growing. The latter prefers a sandy soil. The pink flower trusses of the former are produced in summer.

The Jacaranda, a summer deciduous tree, flowers with masses of blue flowers towards the end of the year. Young plants should be protected from frosts for two or three winters.

The camphor laurel gives a strong compact hedge or tree, with fine evergreen foliage, the young tips in springtime being very rich red in colour. The New Zealand Christmas tree, *Metrosideros tomentosa,* is a greyish-leaved evergreen which gives masses of rich red eucalyptus-like flowers at the end of the year. These are only a few of the handsome trees that could be enumerated.

Before planting, the soil should be well dug over, or ploughed, if the trees are to be grown in rows; then the soil should be moved sufficiently to allow the planting of the tree. It will be wise to drive in a stake before planting, in order to support the tree for the first year.

When it is in position, the roots, if exposed, should be covered with fresh topsoil, and finally the soil must be well firmed all around the roots and the stem. Some water will be necessary occasionally during the first summer.

The Orchard.

Two important operations should now be proceeded with, i.e., pruning and ploughing. These works are so general that they hardly need discussion.

More important work is the winter routine of orchard sanitation, and the winter treatment of tree pests is urgent. Red spider is a common pest all over the State. The weakening of the foliage is very serious, as a result of a spider attack, and winter spraying is necessary. Where San José scale is present, the trees must be sprayed, as export of fruit is prohibited if any scale is present.

These two pests, and many others, are readily killed by using the lime sulphur spray 1 in 9. Considerable improvement in the "kill" follows if a strong winter oil is added to the lime sulphur.

The rough bark of apple and pear trees should be scraped to clean up codling moth larvae and their hiding places. Bark of peach

and quince trees ought to be similarly treated for the Oriental peach moth. All scrapings should be quickly burned.

Peach trees must also be treated for green peach aphis, which will soon be active again. All indications point to a severe spring epidemic, unless action be taken to combat the trouble. Experiments in the Goulburn Valley have proved that the best ovicidal spray is the tar distillate wash, with lime sulphur occupying a second place. One thorough spraying should be given, early in July. This will ensure the trees from becoming re-infested next spring.

The Vegetable Garden.

Where the work has not been done, and where the plants have been producing thin stems, all rhubarb crowns should be lifted and re-planted. Large crowns should be cut into two or three pieces. The new plots must be deeply dug, and well enriched with abundant animal manure. If this be not available, some bonedust should be added to the soil, and the plants later fed with blood manure. It must be remembered that rhubarb plants are very gross feeders, and take a heavy supply of manure.

Preparation may now be made for the early tomato crop. Seeds should be sown in a light soil, either in pots or pans, or in a bed under a frame. In any case, the sown seeds should be protected from cold. Later on the seedlings may be pricked out into boxes, or planted out in the garden. Soil should be prepared by giving a good deep digging and a heavy manuring. This may be allowed to sweeten until seedlings are ready for planting out.

Phylloxera-resistant Vine Rootlings and Cuttings

CONDITIONS under which Victorian vine-growers may purchase phylloxera-resistant vine cuttings and rootlings (grafted and ungrafted) from the State Vine Nursery at Wahgunyah during the current year are now available, and copies may be obtained on application to the Department of Agriculture, Melbourne.

Last season's printed conditions are again being used, but applicants are advised that the dates as stated therein must in every case be advanced by one year.

For grafted rootlings (1935 distribution June to August inclusive), applications will be received until 20th June. For the 1934 distribution the time for receiving applications closed on the 10th June, 1933, and present applicants cannot be supplied until 1935.

For ungrafted rootlings, to be distributed from July to August, 1935 inclusive, applications will be received until 30th June, 1934. After these dates applicants can be supplied only in the event of there being a surplus when all regular applicants have been satisfied.

Applicants are required to decide finally, when filling in their application forms, as to their stock and scion requirements, as no amendment can be permitted later.

It will suffice here to explain that resistant vines are supplied to intending planters in any of the following forms, and at the prices stated (packing extra when consignments are forwarded by rail) :—

Resistant rootlings, grafted with scions previously supplied by applicants, at per 1,000—£20 (deposit, £2 10s. per 1,000).

Resistant rootlings, ungrafted, at per 1,000—£5 (deposit, £1 per 1,000).

Resistant cuttings, at per 1,000—£2 10s.

No application will be entertained unless made on the forms supplied for the purpose, which are obtainable from the Superintendent of Horticulture, Department of Agriculture, 605 Flinders-street, Melbourne; or from the Manager, Viticultural Station, Rutherglen.

Separate forms are provided for (*a*) grafted rootlings, and (*b*) ungrafted rootlings and cuttings. Applications must be filled in on the proper forms, and accompanied by a deposit as specified above.

Professional Papers

[This section is devoted to professional papers and articles of a scientific character.]

Bacterial Plant Diseases in Victoria

By D. B. Adam, B.Agr.Sc., Plant Pathologist, and A. T. Pugsley, B.Agr.Sc., School of Agriculture, University of Melbourne.

THE fact that some plant diseases occurring in Victoria are caused by bacteria has been recognized for many years. This recognition in some cases, apparently, has rested upon evidence of the association of bacteria with a disease rather than upon a study of the physiological reactions of the isolated bacteria and an adequate investigation of their capacity to reproduce the diseased state when inoculated as a pure culture into healthy susceptible plants. In view of this lack of information, it was felt to be desirable that a systematic study of a few of these diseases should be made with a view to filling up some of the gaps in our knowledge.

In this study a uniform procedure has been followed. After making a direct microscopic examination to ascertain whether, and in what parts of the plant, bacteria were present, isolations from the diseased tissue were made. Isolates, which were not obvious contaminants, whose colonies agreed in appearance with those of bacteria previously described as pathogenic, were then tested for pathogenicity and for their growth characteristics on various artificial culture media.

Most of the diseases mentioned in this article are well known abroad. A lesser number have been partially described from neighbouring States, and the account given should be viewed as supplementary to these descriptions. Only one of the diseases discussed, viz., that of the stock, appears not to have been described anywhere previously. Most of the isolations, the cultural work and inoculation experiments which are described, were performed by the junior author during his tenancy of a Research Scholarship at the School of Agriculture, Melbourne University.

Bacterial "Blight" of Mulberry.

The mulberry (*M. nigra*), although not grown on a commercial scale, is quite a common garden tree about Melbourne. The presence of mulberry blight disease was recorded for Victoria by McAlpine in 1898(1),* for South Australia by Osborn 1924(2), and for Tasmania by Nicholls 1926(3), and Dowson 1932(4). This "blight" is now a common disease on the mulberry, although it is probably less common than the fungus disease caused by *Septogloem mori*. The symptoms of this latter disease are distinguished by the roundness of the leaf spots which, when old, have greyish centres, and embedded in them minute black fruiting bodies of the fungus causing the disease.

Symptoms.

The leaf spots of bacterial blight are generally small, angular, and uniformly coloured, having first a water-soaked appearance, but quickly turning brown. Infection of the midrib results in a curling and distortion of the leaf. Stem lesions also occur, but these are not so characteristic on *M. nigra* as they are on *M. rubra*, from which the isolations referred to in this note were made.

The accompanying photograph (Plate I.) shows a naturally blighted twig of *M. rubra*. The terminal leaves had withered, with water-soaked lesions extending longitudinally along the stem, and a viscid cream-coloured bacterial exudate. Cross sections of this stem revealed the presence of bacteria in the xylem vessels and in cavities in the parenchyma.

Description of Causal Organism.

Isolations were made from the stems and leaves of *M. rubra,* and almost pure cultures of white colonies appeared within 48 hours incubated at 27 deg. C. These colonies were small, circular, smooth, and moist, with an entire margin, and composed of Gram-negative, motile bacteria approximately 1.7–2.0μ x 0.4μ. Nutrient broth uniformly turbid, no pellicle; good growth on potato, and a negative diastasic action on starch agar. Abundant growth in Fermi's solution, with a slimy pellicle, later a pale green colour develops; no growth in Cohn's solution. Gelatine not liquefied up to five weeks. Litmus milk slightly decolourized at the bottom after seven days, and later becomes alkaline; there is no peptonisation up to five weeks. Acid produced very slowly in glucose and saccharose peptone sugars, but no acid with lactose. In peptone free sugar media acid produced with glucose and saccharose, but not with lactose. Nitrates not reduced, indol not formed.

* The numbers in brackets refer to a list of references at the end of this article.

Plate I.—Mulberry Blight. Wilt of apical leaves of M. rubra.

Inoculation Experiments.

In experiments where stems and leaves of both *M. nigra* and *M. rubra* were inoculated with the isolate from the stem of *M. rubra,* typical symptoms were reproduced on the stems and leaves of *M. rubra* and on the leaves of *M. nigra.* No symptoms developed on the stems of *M. nigra,* due possibly to the woody nature of the stems. The same organism as was used for inoculation purposes was recovered from the infected stems of *M. rubra* and the leaves of *M. nigra.* Controls pricked with sterile needles remained healthy.

Discussion.

This isolate differed from the description of *B. mori,* Boyer and Lambert, emend E. F. Smith, 1910, in that it exhibited no diastasic action on starch agar, and did not peptonize litmus milk.

On many of the isolation plates there developed a rapid-growing Gram negative organism producing yellow colonies on beef agar, but it proved to be non-pathogenic. The presence of this organism in mulberry "blight" lesions is so common as to be almost characteristic.

A Bacterial Disease of Stocks.

(*Matthiola incana*).

In August, 1933, inquiries were received from two separate places concerning a disease of stocks (Matthiola) which had not been observed previously. Subsequently reports of the disease occurring in other districts were received. A number of varieties, including "Queen Alexandra," which was most prominent, were infected.

According to one of the growers whose place was visited the disease had started about mid-July in a slight depression on some low-lying land where the stocks were growing. From thence it had spread fairly rapidly over the whole area. By the end of August the commercial value of the flowers was destroyed, but only a few of the originally affected plants were actually dead. Upon the development of slightly warmer spring weather, though the conditions were still moist, the disease ceased to spread appreciably.

Symptoms.

The main point of attack was on the stem a little behind the growing tip. The lesions were dark-greyish green and water-soaked, extending for some distance down the stem, and quite frequently entirely surrounding it. The tops of such infected plants usually did not wilt. Lesions also occurred on other parts of the stem and on the stalks subtending the flowers which became useless for commercial purposes. As the lesions developed they turned brown, and the cortex tended to split.

On the leaves of severely affected plants very small, round, water-soaked lesions occasionally appeared. Accompanying this was a yellowing of the leaf tips; a development which proceeds towards the leaf base. These leaf lesions, however, were a minor feature of the

disease, many infected plants showing stem lesions and yellowing of the leaf tips, but no definite leaf spots.

Description of the Causal Organism.

Bacteria occur in abundance in the outer parenchyma cells of the stem from which they can be isolated. The organism is a short (approximately 1.7–3.4μ x 0.7μ) Gram-negative motile rod. On beef extract agar smooth white glistening colonies appear after 48 hours at 27 deg. C. Positive diastasic action on starch agar; abundant growth in Fermi's solution, with green discolouration after 10 days; gelatine liquefied; litmus milk alkaline at the top and decolourised at the bottom, after about 7 days the whole tube turns to a dirty cream colour. Acid but no gas from glucose and saccharose, but not from lactose in peptone free media; no indol produced; and nitrates are not reduced. Rough variants having the same cultural reactions have been observed.

Inoculation Experiments.

In these experiments conducted in a glasshouse in October needle punctures were made a sort distance below the top of the stem, appropriate controls which remained free from disease being provided. Infections appeared in five to seven days as water-soaked areas surrounding the point of inoculation, but did not develop further. From the edge of these infections the same bacterium as that used for inoculation purposes was isolated.

A few of the inoculated plants were left in the glasshouse through the summer months, and eventually, as the stems grew larger, a layer of cork cells developed beneath the lesions and, two months later, broad scars on the stems were the sole evidence of the infection.

Discussion.

Two bacterial diseases of stocks have been described. One is caused by *Phytomonas campestris* (Pammel) Bergey et al, the other by *Phytomonas matthiolae* (Briosi) Bergey et al.

The first of these diseases is definitely vascular in nature, and is caused by an organism whose characteristics are quite distinct from our organism. The second disease also appears to be vascular in character and symptomatically distinct from the local disease. Its physiological features are so poorly defined that distinction is not easy to make on these grounds.

The organism causing the disease locally is clearly one of the green fluorescent group, but in the absence of fuller knowledge concerning its relationship to other members of this group as revealed by cultural and serological reactions and its pathogenic capacities we think that it would be premature to attempt to name it.

Bacterial Wilt of French Beans.

(Phaseolus vulgaris).

Several bacterial diseases of French beans have been described. They are reviewed by Burkholder(5). In Victoria one of them, viz., *Halo Blight* (*Phytomonas medicaginis phaseolicola* Burkholder (*P.m.p.*) has developed to such epidemic proportions in recent years that it has obscured the presence locally of at least one other of these diseases; the subject of this note.

Evidence of the presence of this disease was first secured through an examination of "Magnum Bonum" seeds. The white seeds of this variety when infected with bacteria may show yellowish markings due to the presence of bacterial masses under the integuments. Because of the ease in obtaining pure cultures from such sources these "Magnum Bonum" seeds have been used frequently as a source of the halo blight organism. In the course of the work it was noted that, while pure cultures of an organism producing white colonies usually developed (*i.e.*, *P.m.p.*) occasionally there were plates of pure culture isolations of a quick-growing yellow Gram-negative organism and other plates of a slower growing yellow Gram-positive organism.

The following account deals with this last organism. Subsequently to noting these different isolates, we found that the lesions on the seeds yielding the different organisms could be distinguished by their colour. Thus seeds with maize yellow to cream coloured (Ridgway) lesions yielded *P.m.p.*, while seeds with light orange yellow lesions yielded *Phytomonas flaccumfaciens* as described later.

Although seeds infected with *P.m.p.* and seeds infected with *P. flaccumfaciens* are often present together in a seed sample, in no case have we found the two organisms present in one seed.

Symptoms of the Disease.

Typical stunting and wilting occur in seedlings grown from infected seeds. The wilting commences at the leaf tip or margin whence it spreads over the whole leaf.

The leaf symptoms, in contrast with those of "halo blight," are confined to a wilting of the leaves. When the disease develops early in

the life of the plant death or stunting occurs. Prepared cross sections of the stems of infected plants show that the invading bacteria are limited in their distribution to the xylem. In infected pods, while no well-defined lesions have been seen, a slight darkening of the dorsal suture sometimes can be observed.

Description of Causal Organism.

The organism isolated from "Magnum Bonum" seed is a short (0.8–1.0μ x 0.5–0.6μ) Gram-positive, non-motile rod. On beef extract agar cream yellow, smooth, glistening, round colonies develop slowly, appearing in 48 hours incubated at 27 deg. C. Growth in broth is never abundant, no pellicle, but a characteristic slimy sediment develops after about a week; on potato a moderate yellow growth, and on starch agar a fair diastasic action after three days. Very scanty growth occurs in Fermi's solution, which is not clouded, but becomes slightly yellow coloured, no growth in Cohn's solution; gelatine is slowly liquefied. Litmus milk is decolourized, finally becoming a cream yellow colour, there is a soft curd formed and slow peptonisation. No acid or gas is produced in glucose, saccharose, or lactose peptone sugars. Where the tests were conducted in peptone free media, growth was poor, but a slight acid production with glucose, and little or no acid from saccharose or lactose. No indol formed, and nitrates not reduced.

Inoculation Experiments.

Inoculations into the stems of healthy plants of Canadian Wonder beans at various times during the summer produced wilting symptoms after two to three weeks. When isolations from plants so treated were made at points on the stem an inch or more from the site of inoculation, cultures of the same organism as that used for inoculation purposes were obtained. In another experiment where a series of plants was inoculated by atomising them with a 48-hour-old broth culture no infections resulted.

Leaves in all stages of growth inoculated by needle punctures usually gave negative results, but in one case the needle had punctured a vein and given rise to wilting of the leaf beyond the point of inoculation (Plate II.).

In a further experiment twenty Canadian Wonder bean seeds were soaked for three hours in a young broth culture of *P. flaccumfaciens*. Four weeks later ten out of the fifteen germinated seeds had wilted. From these wilted plants the same organism as that used for the inoculation was recovered. Control plants from seeds soaked for the same period in sterile broth grew healthily. Pods of the "Magnum Bonum" variety at different stages of growth were inoculated at various points along the dorsal suture and on the side of the pod. The young pods inoculated at the stem end soon stopped development and shrivelled without producing seed. Older pods similarly inoculated sometimes developed a slight darkening of the tissue along the dorsal suture, but this was not very marked. Ultimately the white-coated seeds in these pods were discoloured in the same way as those from which the organism was first obtained. The wilt organism was readily re-isolated from such infected seed.

Plate II.—Bean leaflet artificially inoculated with P. flaccumfaciens. (The distortion of the left-hand side of the leaf is due to inoculation of a vein. Inoculation of the lamina normally results in no apparent infection).

Where inoculations were made into the side of the pod no evident symptoms developed. However, where the needle had penetrated a developing seed the mature seed showed light orange-yellow discoloured patches.

Discussion.

The organism described above differs from the description of *B. flaccumfaciens* in that it is non-motile and produced little acid in sugar media. Nevertheless its general characteristics are such that at this juncture we do not think it desirable to discriminate between the organism isolated by us from that described by Miss Hedges(6).

Burkholder, in his analysis of the genus *Phytomonas*(7), formed the opinion that the non-motile forms of the genus as judged by their growth and staining characteristics and their physiological reactions were so uniform as to constitute a group which he called the Stewarti group. He also pointed out that there existed certain forms, including *P. flaccumfaciens* (Hedges), which, but for their character of motility, fit in to the Stewarti group. The definitely non-motile character of our isolates thus support Burkholder's belief in the affinity between *P. flaccumfaciens* and members of the Stewarti group.

A notable feature of this wilt disease of beans is the fact that, apart from seed infection, the development of the disease is confined to the vascular system. It appears, too, that apart from possible seed inoculation, successful infection of a plant is dependent upon the inoculum being introduced through a wound into or near the vascular system. Such a requirement for the establishment of the disease obviously has an important bearing on the spread of the disease under field conditions, but this aspect of the problem has not yet been studied in Victoria.

Walnut Blight.

According to Cole(8) walnut blight has been known in Victoria for a long time; Rodway(8), and Osborn and Samuel(10) have recorded it for Tasmania and South Australia respectively.

Symptoms.

Numerous small angular brown spots occur on the leaves where they are frequently confined to regions at the apex or margin of the leaf corresponding to those areas where rain and dew droplets collect. These spots may coalesce to form dry broken patches. Infection of the midrib often results in a distortion or curling of the leaflets.

Early infection of the fruits usually leads to a rotting of the kernel or the fruits may drop before maturing. Secondary infections of more mature fruits first appear as water-soaked spots which increase in size and become black in colour (Plate III.).

Description of Causal Organism.

Isolations were made from diseased leaves and nuts in the early summer of 1933. Almost pure cultures of pale lemon-yellow colonies appeared within 36 hours incubated at 27° C. These colonies were round, smooth, moist, glistening with an entire margin, and composed of motile gram negative bacteria approximately 1.7μ x 0.6μ. Abundant growth in broth which becomes uniformly turbid, good growth on potato and a strong diastasic action on starch agar. Little or no growth in Fermi's solution; no growth in Cohn's solution. Litmus milk peptonized at surface in 4–5 days and later a soft curd forms. No acid or gas in peptone water with either glucose, saccharose or lactose. In peptone free media growth was poor, but acid was slowly produced with glucose, saccharose and lactose. Gelatine liquefied, nitrates not reduced, indol not formed.

The local isolate thus differed from the description of *B. juglandis* (Pierce) E. F. Smith as given by Elliot in that it was Gram negative and produced no indol. In respect of Gram staining it agreed with Dowson's isolation (l.c.), and in its inability to produce indol it behaved similarly to an English strain isolated by Wormald(11).

Inoculation Experiments.

Using prick inoculations and a suspension of the isolate from a diseased leaf conspicuous black spots developed on the inoculated leaves in three to four days. Similar lesions were produced by atomizing the leaves with the suspension. Similar inoculation of the petiole gave rise to a blackened area surrounding the puncture, which was later followed by a darkening of the veins of the leaflets. From all these infections bacteria similar to those used for the inoculation purposes were recovered. Controls pricked with a sterile needle or atomized with sterile distilled water remained healthy.

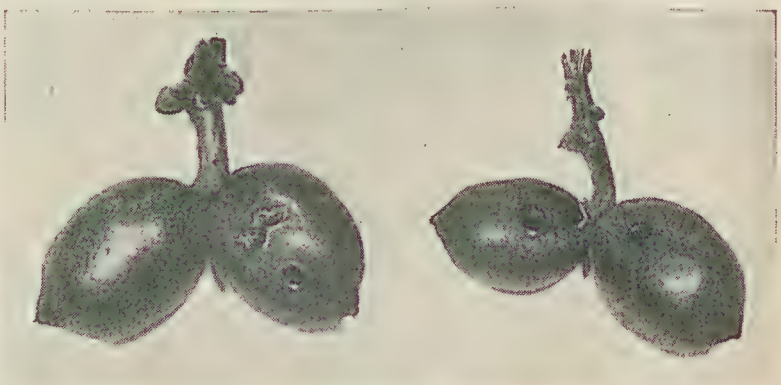

Plate III.—Naturally occurring lesions of "blight" on walnut fruits.

Crown Gall.

Although the presence of crown gall has been suspected for many years in different parts of the Commonwealth, and references to it have been made by Birmingham(12), Grieve(13), its formal identification in Australia does not appear to have been recorded.*

Symptoms.

Under natural circumstances the disease in Victoria occurs most frequently on stone fruits such as almonds and peaches. As the name implies, the general symptoms of the disease are tumour-like swellings on the crown and roots of affected plants. The affected trees are generally stunted, the degree of which appears to depend on the site of the crown gall development and upon the environmental conditions under which the infected plant is growing. Thus a crown gall located at the insertion of the large roots may seriously affect tree-growth, especially if the tree is growing in poor soil.

The organism here recorded was isolated from a typical young crown gall on a seedling peach tree grown in a nursery on the Mornington peninsula.

An extract from a surface sterilized gall plated on to beef extract agar yielded small smooth raised colonies with an entire margin which appeared in two to three days in plates incubated at 27°C.

Description of Causal Organism.

The bacteria from such colonies were short non-motile rods approximately 1.0μ x 0.4μ and Gram negative. Uniform turbidity is produced in broth, no pellicle; greyish white growth on potato, no diastasic action on starch agar; fair growth in Fermi's and Cohn's solutions; gelatin not liquefied. No indol and nitrates not reduced. Litmus milk acid after 7 days and a clot. Acid produced from glucose, saccharose and lactose in peptone free solutions. In the presence of peptone acid is slowly formed from glucose but not from saccharose and lactose.

Inoculation Experiments.

Inoculations of the isolation from peach galls by needle punctures were made into the stems of peach, vine, oleander, *Ricinus, Pelargonium,* tomato, and tobacco. In each case controls were set up in which the stems were pricked with sterile needles. These controls remained healthy throughout the experiments. The inoculated plants had all developed galls at the point of inoculation within four weeks.

From the galls (Plate IV.) on *Ricinus* non-motile bacteria were re-isolated and grown on

Plate IV.—Crown gall on Ricinus produced by artificial inoculation.

culture media in comparison with the original isolation and proved to be the same. This second isolation was used to produce galls on *Ricinus* again, from which a similar non-motile organism was again re-isolated.

Discussion.

The organism described above differs from that of *Phytomonas tumefaciens* (Smith and Townsend) Bergey et al., in that it is non-motile, produces acid in litmus milk, and gives no evidence of indol production. However, non-motile strains of *P. tumefaciens* Kauffmann(14), and strains which turn litmus milk pink Riker(15) have been described. Neither these facts nor the fact that the production of indol by *P. tumefaciens* normally is scanty, seem to supply a good reason for drawing specific distinctions between the organisms; consequently we consider that the isolation from the peach crown gall should be considered a strain of *P. tumefaciens.*

A Bacterial Canker Disease of Oleanders.

(*Nerium Oleander*).

Last summer it was noted that there was a very common disease present on oleanders in gardens about Melbourne, and especially on

sidered a strain of *P. tumefaciens.*

* It was identified, however, after this paper was in type. See B. J. Grieve, *Proc. Roy. Soc. Vict.*, Vol. XLVI. N.S. Part II., p. 214.

Symptoms.

Disease lesions occur on leaves, stems, both old and young, pods, and peduncles. The leaf spots at first are cream coloured, but become brown to black, and are often surrounded by a yellow halo. These spots usually develop into small hypertrophies or warts on the upper surface of the leaf (Plate V.), leaving a corresponding sunken pit on the under side. Occasionally the small tumors or warts develop on the lower surface of the leaf. Infection of the midrib is common. It first appears as a water-soaked elongated area which develops into a brown or black canker surrounded by the paler zone of the leaf blade. The overgrowth of the midrib at the points of infection causes the leaf to bend sharply towards the stem. Young leaves when infected as they emerge from the buds are malformed and distorted.

Plate VI.—Seed pods of Oleander showing malformation caused by P. tonellianum—the pod on the lower left-hand side is a late infection and is almost normal.

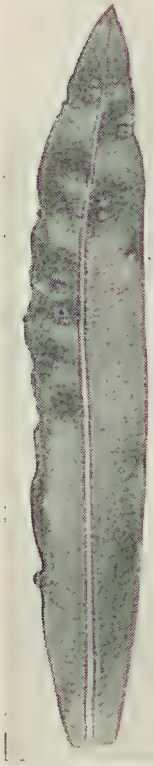

Plate V.—Oleander leaf showing cankers caused by P. tonellianum.

Dark-coloured elongated areas, which are only slightly swollen, are the first symptoms to develop on the young infected stems. Later the epidermis splits and the lesion becomes canker-like and persists as such on the old wood. Similar cankers are produced on the peduncles.

Young pods when infected do not develop further, but remain short, thick, and malformed, and partly covered with necrotic black patches. On older pods small warts develop. (Plate V.)

Several isolations have been made from diseased leaves and stems, and in each case slow-growing white colonies of bacteria appeared after two days incubation at 27°C.

Description of Causal Organism.

Motile Gram negative rod approximately 1.2–2.0μ x 0.4μ. Slow growing on nutrient agar as small, moist, smooth, circular, white colonies. Uniform turbidity in broth after 24 hours, growth not abundant, slight sediment. Fair amount of white growth on potato cylinders, negative diastasic action on starch agar. Growth in Fermi's and Cohn's solutions. Litmus milk becomes slightly blue after one week and then decolourized, finally after one month it is cream-grey colour, no curd or peptonization. No acid or gas in peptone water with glucose, saccharose or lactose, but in peptone free medium acid is formed with glucose and saccharose but not with lactose. Gelatin not liquefied, nitrates not reduced, indol not formed.

Inoculation Experiments.

Stem inoculations by needle punctures produced cankers similar to those occurring naturally. Inoculation of the midrib gave a reaction in three days. The first sign was a kinking of the leaf at the point of inoculation. Soon after, a water-soaked area developed surrounding the puncture, and this became canker-like after one to two weeks.

Inoculation into the leaf blades produced water-soaked spots which became brown and surrounded by a yellow halo. The pathogene was re-isolated from the stem and midrib, and used for a further successful inoculation of the leaf.

A further experiment was conducted in which a stem of oleander was inoculated at one point with the crown gall organism, and at another with the isolation from the oleander. Lesions developed at both points, but they were quite distinct in type of development and ultimate character.

In these experiments control inoculations with a sterile needle were provided, and plants so treated remained healthy.

Discussion.

Diseases similar to the above have been described from Italy and California. Both were found to be caused by what is probably the same organism. From the symptoms of the disease in Victoria and the cultural reactions of the pathogene, we consider that we are dealing with a similar organism to that described by Ferraris in 1926 as Bacterium tonellianum. Brought into line with the system of nomenclature adopted in this paper, the causal organism of oleander canker in Victoria is determined to be *Phytomonas tonellianum* (Ferraris) n. comb.

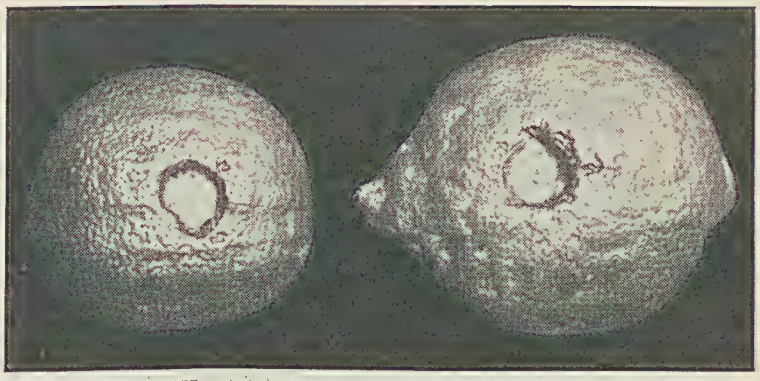

Plate VII.—Black pit on lemons—natural infections.

Black Pit of Lemons.

The first account of black pit of lemons in Australia appeared as an abstract of Lewcock's work in 1924(16). A further note was published by the same author in 1926(17), where he mentioned the presence of the disease in Victoria. Carne in the same year reported it from Western Australia(18). In southern Victoria this disease can be found in most lemon groves practically every year, but especially during a wet spring.

Symptoms.

In the field the occurrence of the disease on the fruit appears always to be associated with an injury such as is caused by a thorn.

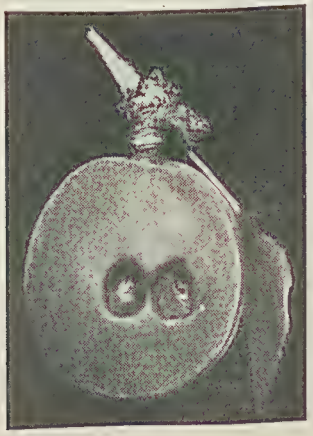

Plate VIII.—Black pit-like lesions on apricots produced by artificial inoculation with P. syringæ. Control inoculations about ¼-inch above the pits show no signs of infection.

Following infection of the lemon fruits there develop spots or pits which are black and sunken though, as they enlarge, the centre may become reddish-brown (Plate VII.). These spots, seldom exceeding 20 mms. in diameter, are confined to the rind, and do not affect the pulp.

On the twigs of the lemon reddish-brown lesions surround the insertion of the leaf petioles. Apparently these lesions have arisen from leaf infections in the manner described by Fawcett and Lee(19), but we have not had the opportunity of studying this phase of the disease.

Pure cultures of smooth circular colonies, pearl-grey in colour, were obtained from the diseased tissue of the lemon fruit.

Description of Causal Organism.

These colonies appeared on plates incubated at 27° C. in from 24–36 hours. On beef infusion agar a green colour was produced in the substrate, but on beef extract agar this green colouration did not develop. The organism was a Gram negative short motile bacterium and approximately 1.2–2.4μ x 0.5μ. Good growth occurs in broth, and a moderate white growth on potato, on starch agar there is a slight diastasic action after three days. Abundant growth in Fermi's solution with a heavy slimy pellicle and after ten days the medium becomes pale-green. No growth in Cohn's solution. Gelatin is liquefied rapidly. Litmus milk is peptonized, beginning at the surface and working down in definite zones, the colour changing from grey to yellow-green. No acid or gas in peptone water with glucose, sucrose or lactose. In peptone free media acid is produced with glucose and sucrose but not lactose. Nitrates are not reduced nor is indol formed.

Inoculation Experiments.

Providing appropriate controls, which all remained healthy, needle prick inoculations were made into a wide range of host plants. On Lisbon lemons held at room temperature typical sunken spots appeared in three days,

[*Continued on page* 323.

Standard Herd Records

Complete Return of the Cows which completed the Tests during the Quarter ended 31st March, 1934.

In the following is set out the records of all cows which completed a lactation during the quarter. The number is 393, of which 251 qualified for the certificate. The figure in brackets after the owner's name shows the number of entries that qualified for the certificate.

The amount of butter fat required for qualification varies according to the age of the animal (up to 5 years at time of calving) the standards being as follow:—

Junior 2 year old (under 2½ years at time of calving)	230 lb. butter fat.
Senior 2 year old (between 2½ and 3 years at time of calving)	250 lb. butter fat.
Junior 3 year old (between 3 and 3½ years at time of calving)	270 lb. butter fat.
Senior 3 year old (between 3½ and 4 years at time of calving)	290 lb. butter fat.
Junior 4 year old (between 4 and 4½ years at time of calving)	310 lb. butter fat.
Senior 4 year old (between 4½ and 5 years at time of calving)	330 lb. butter fat.
Mature cow 5 years and over	350 lb. butter fat.

(Except where otherwise stated, the period of Test was 273 days.)

Name of Cow.	Herd Book No.	Date of Calving.	Milk last day of Test. lb.	Milk lb.	Average Test.	Butter Fat. lb.	Standard required.	Class.	Previous Yields of Butter Fat.	Sire.
Allan, F. de Vere, Toora, Jersey (1).										
Glen Alice Charm	39795	27.5.33	19½	5,590	5·09	284·76	230	Jr. 2	..	Clarendon Eyre Student Prince
Alston, N. B., Romsey, Jersey (1).										
Rosyth Lady Tulip 5th	36781	4.4.33	14½	5,213	4·73	246·68	250	Sr. 2	260	Aveley Antony
Rosyth Lady Jessie	26377	11.4.33	23½	5,688	5·26	299·44	350	Mature	276, 328, 335, 351	Lord 2nd of Brucevale
Rosyth Noble Duchess	41903	25.6.33	11	4,811	6·10	293·57	250	Sr. 2	310	Aveley Antony
Atkinson, W. K., Swan Hill, Milking Shorthorn (4).										
Willow Park Dainty 2nd	Vol. 1 D.S.H.B.A.	14·5·33	26	10,179	3·90	396·52	350	Mature	258, 342, 344, 344, 319	Willow Park Count
Willow Park Melba 3rd	Vol. 8	18.5.33	36	9,969	4·10	408·36	350	Mature	327, 291	Willow Park Rosemont
Willow Park Butterfly	13201	25.5.33	22	7,998	4·21	336·46	350	Mature	301, 356, 406, 393, 359	Willow Park Colonel
Willow Park Blush 3rd	Vol. 1 D.S.H.B.A.	7.6.33	35	11,784	4·65	547·74	310	Jr. 4	375	Willow Park Design
Willow Park Ruby 5th	Vol. 1 D.S.H.B.A.	8.6.33	30½	7,217	4·55	328·53	290	Sr. 3	244	Willow Park Bondsman
Austin, F., Lara, Jersey (5).										
Avalon Noble's Pansy 6th	38724	4.4.33	13	3,956	6·62	262·05	230	Jr. 2	..	Avalon Noble
Avalon Gladstar's Pansy 6th	38723	5.4.33	16	5,010	5·70	285·33	230	Jr. 2	..	Avalon Gladstar 2nd
Avalon Noble's Pansy 5th	36835	31.5.33	14½	5,193	6·00	311·47	250	Sr. 2	237	Noble of Avalon
Avalon Noble's Belle 8th	32906	4.6.33	14½	5,900	5·72	337·44	290	Sr. 3	350	Noble of Avalon
Avalon Noble's Daisy 2nd	32907	19.6.33	23	8,685	6·24	542·30	290	Sr. 3	450	Noble of Avalon
Axford, W. H., Camperdown, Jersey (8).										
Leura Butterfly	24231	16.4.33	22½	7,904	4·76	376·19	350	Mature	295	Grant of Melrose
Leura Beauty 9th	36837	1.5.33	20	5,558	6·17	343·02	290	Sr. 3	375	Curiosity's King of Comely Banks
Leura May 8th	36841	8.5.33	20½	8,523	5·22	444·93	290	Sr. 3	..	Curiosity's King of Comely Banks
Leura Silverbelle 8th	40695	10.5.33	10½	4,910	5·08	249·29	230	Sr. 2	..	Curiosity's King of Comely Banks
Springvale Doreen	21162	12.5.33	12	6,232	5·17	322·20	350	Mature	375, 400	Sweet Fox of Springvale
Leura Beauty 8th	36836	24.5.33	16	6,277	5·51	345·85	290	Sr. 3	..	Curiosity's King of Comely Banks
Leura May Queen	C.R.	24.5.33	18½	7,454	4·46	332·45	270	Jr. 3	..	Thelma's King 2nd of St. Albans
Leura Myrtle 3rd	C.R.	26.4.33	20	6,659	5·56	370·14	330	Sr. 4	387	Curiosity's King of Comely Banks
Springvale Doreen 2nd	32913	26.6.33	14	7,791	5·76	448·76	310	Jr. 4	..	Thelma's King 2nd of St. Albans
Ballarat Orphanage, Ballarat, Jersey (2).										
Orphanage Audrey Jessie	32928	16.4.33	17	6,119	4·83	295·45	330	Sr. 4	228, 286	Audrey's Allan of Tavistock
Trawalla Bettine	37865	17.5.33	N.O.C	4,605	5.40	248·64	250	Sr. 2	..	Kyora's Substitute
Orphanage Garenne	41401	21.5.33	20	5,852	5·47	319·89	250	Sr. 2	..	Orphanage Vanguard
Orphanage Maude	41404	16.6.33	12½	5,684	5·54	314·95	250	Sr. 2	..	Orphanage Quicksand's Prince

STANDARD HERD RECORDS—*continued.*

Name of Cow.	Herd Book No.	Date of Calving.	Milk last day of Test. lb.	Milk. lb.	Average Test.	Butter Fat. lb.	Standard required.	Class.	Previous Yields of Butter Fat.	Sire.
Barber, H. P., Somerville, Jersey (0).										
Somerville Valdera ..	28987	12.5.33	16½	6,684	4·46	297·87	350	Mature	365, 373 ..	Rosella's Lad of Somerville
Batten, H. J., Panmure, Jersey (1).										
Mt. Warrnambool Duchess 2nd	41169	28.4.33	12½	6,467	5·61	362·55	230	Jr. 2	.. ..	King's Vale Rosella 11th's Lad
Bazeley Bros., Tatura, Jersey (0).										
Burfield Daphne	31792	8.5.33	17½	6,488	5·25	340·84	350	Mature	374 ..	Winsome's Mike of Cullenbone
Belfield, G. H., Estate late, Coleraine, Jersey (2).										
Wootong Vale GoldenBeauty	21115	31.3.33	24½	8,908	4·79	426·72	350	Mature	472, 448, 476	Golden Prince of Clover Flat
Wootong Vale Golden Rance	42640	28.5.33	N.O.C.	7,556	4·84	365·93	290	Sr. 3	384 ..	Wootong Vale Gold Duke
Bidgood, F., Wodonga, Jersey (2).										
Staghorn Master's Clementine	22980	16.4.33	23	8,290	6·25	518·12	350	Mature	388, 415, 409, 524	Werribee Northern Masterpiece
Staghorn Northern Princess	36899	29.5.33	17	6,442	6·03	388·22	230	Jr. 2	.. ..	Werribee Northern Masterpiece
Black, Mrs. A. J., Noorat, Jersey (4).										
Noorat Gazelle	25268	15.4.33	16½	7,907	5·33	421·76	350	Mature	262, 274, 432	Cellist of Warenda
Noorat Geranium.. ..	25269	26.4.33	18	7,169	5·63	403·46	350	Mature	288, 341, 377	Cellist of Warenda
Noorat Music	32993	2.5.33	17½	6,533	5·27	344·36	330	Sr. 4	315, 381 ..	Cellist of Warenda
Noorat Sunny	32995	18.6.33	14	6,030	6·13	369·53	330	Sr. 4	273, 382 ..	Cellist of Warenda
Black, I. S., Noorat, Ayrshire (4).										
Mount Noorat Scottish Lassie	20556	21.4.33	15½	9,380	3·93	368·37	310	Jr. 4	286, 331 ..	Scottish Fame of Gowrie Park
Ben Kell Poppy 3rd ..	17318	27.4.33	14½	7,601	4·56	346·98	350	Mature	275, 270, 321	Ben Kell True Line
Mount Noorat Poppy 2nd..	Vol. XXVI.	22.5.33	16½	7,362	4·62	339·91	230	Jr. 2	.. ..	Scottish Hero of Gowrie Park
Mount Noorat Peggy ..	Vol. XXVI.	7.6.33	13	6,780	4·19	284·22	230	Jr. 2	.. ..	Scottish Hero of Gowrie Park
Mount Noorat Pyrene 2nd..	Vol. XXVI.	10.6.33	12½	7,304	4·50	328·33	230	Jr. 2	.. ..	Scottish Hero of Gowrie Park
Bott, J. and N., Yarrawonga, Red Poll (1).										
Naranghi Wildflower ..	3283	28.4.33	17½	6,098	4·47	272·41	270	Jr. 3	299 ..	Woodburn Premier
Box, Dr. J., late Whittlesea, Jersey (2).										
Bellfaire Blond's Beatrice ..	Vol. XXI.	26.5.33	15½	5,471	5·43	297·21	230	Jr. 2	.. ..	Napoleonette's Golden Oxford
Bellfaire Bijou Belle ..	26739	2.6.33	18½	5,801	6·07	351·99	330	Sr. 4	348 ..	Sherborne Wyandotte's Distinction
Broad, A. A., Sutton Grange, Jersey (1).										
Harcourt Maybelle ..	36969	7.5.33	19	8,171	4·14	338·10	230	Jr. 2	.. ..	Preston Royal Fancy
Buchanan, J. M., Flinders, Ayrshire (0).										
Gleneira Rose	23848	27.6.33	8½	5,964	3·69	220·25	290	Sr. 3	.. ..	Gleneira Expert
Chadderton, J. E., Hamilton, Jersey (3).										
Glen Leigh Daisy ..	37035	2.4.33	15	4,400	5·85	257·21	230	Jr. 2	.. ..	Strathkellar Topthorn
Glen Leigh Dream ..	37040	21.5.33	13	4,337	5·33	231·05	230	Jr. 2	.. ..	Strathkellar Topthorn
Glen Leigh Doris 3rd ..	37039	9.6.33	19	7,322	5·92	433·68	230	Jr. 2	.. ..	Strathkellar Topthorn
Chester, E. N., Mt. Scobie, Jersey (0).										
Radford Hibiscus 2nd ..	41688	29.5.33	15	3,345	5·17	173·01	230	Jr. 2	.. ..	Ballara Golden Lad
Aveley Cream Lass ..	24220	4.6.33	21½	6,105	5·47	333·85	350	Mature	331, 342 ..	Marc Anthony of Aveley
Chirnside, R. M., Whittlesea, Jersey (1).										
Brucevale Fancy Starbright 2nd	25802	20.4.33	30	8,076	6·14	495·49	350	Mature	338, 309, 484, 609	Masterpiece of Brucevale
Christian, Mrs N. C., Mortlake, Jersey (0).										
*Staghorn Northern Clementine	42012	15.6.33	4	3,060	6·30	192·75	250	Sr. 2	303 ..	Staghorn Northlark's Masterpiece
Christie, A., Yea, Jersey (3).										
Wattle Grove Juanita ..	28665	31.3.33	19½	8,421	5·00	421·37	310	Jr. 4	339 ..	Alert of Farrington
Aveley Artistic	23156	30.4.33	17½	6,707	5·67	379·99	350	Mature	.. ..	Paynter of Aveley
Wattle Grove Sympathy ..	Vol. 21	1.5.33	17½	6,729	4·49	302·24	230	Jr. 2	.. ..	Wattle Grove Jersey Lad
Clarke, A. B., Noorat, Jersey (0).										
Denniston Princess ..	33172	27.6.33	..	4,988	4·75	237·04	310	Jr. 4	279, 229 ..	Valiant Prince of Glen Iris
Clark, P. W., Whittlesea, Jersey (1).										
Coodardy Gentle Annette ..	C.R.	3.4.33	N.O.C.	5,895	4·97	293·10	230	Jr. 2	.. ..	Kantara Don Juan

* 240 days in test.

Standard Herd Records—*continued.*

Name of Cow.	Herd Book No.	Date of Calving.	Milk last day of Test. lb.	Milk. lb.	Average Test.	Butter Fat. lb.	Standard required.	Class.	Previous Yields of Butter Fat.	Sire.
Clyne, J., Upper Maffra West, Jersey (7).										
Paisley Corolla	33176	1.4.33	19	6,821	5·85	398·85	290	Sr. 3	322, 390 ..	Werribee Master Key
Mistletoe of Swansea ..	21193	7.4.33	24	8,781	4·41	387·55	350	Mature	341, 466, 499, 462, 465	Prince of Belgonia
Jersey Vale Larkspur ..	25314	14.4.33	18	7,281	5·01	365·02	350	Mature	374, 378, 400	Prince's 2nd Twylish of Grangelea
Werribee Fancy Madeira 4th	25800	17.4.33	27	8,484	5·34	452·95	350	Mature	371, 471, 499, 497	Masterpiece (Imp.)
Paisley Pearl	37109	21.4.33	27	8,090	4·76	384·83	310	Jr. 4	269, 268 ..	Werribee Master Key
Paisley Fussy	C.R.	1.5.33	16	4,868	5·33	259·62	230	Jr. 2	.. ..	Paisley Master Boy
Paisley Rose Petal ..	37112	1.5.33	26	7,529	5·69	428·20	310	Jr. 4	310, 425 ..	Werribee Master Key
Belle Vue Nancy 2nd ..	Vol. XXI.	15.5.33	11	3,623	5·30	191·89	230	Jr. 2	.. ..	Goldfinder (Imp.)
Cockbill Bros., Bacchus Marsh, Ayrshire (1).										
Fulham Model	14645	30.3.33	18	5,685	5·12	290·88	350	Mature	273, 348, 323, 355, 339	The Laird of Sparrovale
Fulham Topic	20029	14.4.33	13½	6,146	3·99	245·43	330	Sr. 4	309, 273 ..	The Laird of Sparrovale
Fulham Beautiful 2nd ..	23743	31.5.33	20½	6,411	3·99	256·01	250	Sr. 2	.. ..	Olivedale Comet
Fulham Floss	23745	19.6.33	10½	5,292	4·55	241·03	250	Sr. 2	.. ..	Fulham Future
Fulham Torture	14646	19.6.33	10	8,336	4·18	348·71	350	Mature	242, 313, 312, 359, 398	The Laird of Sparrovale
Cockbill Bros., Rockbank, Ayrshire (0).										
Fulham Carrie 2nd ..	22745	14.4.33	11	3,230	4·82	155·72	230	Jr. 2	.. ..	Olivedale Comet
Cockbill Bros., Tongala, Ayrshire (0).										
Fulham Connie	14639	21.6.33	13½	6,398	3·90	249·22	350	Mature	230, 265, 291, 288, 361	Fulham Cameron
Colenso, L. W., Alvie, Jersey (6).										
Normandie Mayflower 4th..	33194	31.3.33	13½	5,030	5·68	285·82	250	Sr. 2	376 ..	Normandie White Peer
Glenfield Primrose ..	33187	14.4.33	14	6,417	5·20	333·98	330	Sr. 4	268, 220, 400	Glenfield Bosun
Normandie Buttercup 2nd..	33188	20.4.33	22½	7,164	5·75	412·11	290	Sr. 3	317, 486 ..	Peer of Lewisham
Normandie Mayflower 2nd..	33192	15.4.33	18	6,161	5.57	343·21	350	Mature	277, 337 ..	Thelma's King of St. Albans
Normandie Hawthorn ..	33190	18.5.33	20	7,203	5.42	395·23	330	Sr. 4	320, 427 ..	Peer of Lewisham
Normandie Mayflower 3rd ..	33193	18.5.33	19½	6,614	5·78	382·34	290	Sr. 3	290, 277 ..	Peer of Lewisham
Normandie Hawthorn 3rd ..	41296	26.6.33	13	5,726	4·96	284·05	230	Jr. 2	.. ..	Peer of Lewisham
Cook, D. E., Loch, Jersey (1).										
Wattle Vale Flirt ..	33198	4.6.33	11½	4,550	6·13	279·13	290	Sr. 3	230, 287 ..	Retford Deer's Noble
Wattle Vale Spring Queen..	28589	12.6.33	7½	4,538	5·31	242·43	330	Sr. 4	234, 344 ..	Retford Deer's Noble
Wattle Vale Pride's Treasure	33199	20.6.33	13	5,754	5·65	324·86	310	Jr. 4	214 ..	Retford Deer's Noble
Coughlin, C., Catani, Jersey (1).										
*Hazel Dell Beauty ..	21739	12.6.33	4	4,460	5·74	255·80	350	Mature	293 ..	Sir Duke of Woorayl
Glady's Park Defenders May	37133	17.6.33	22	6,920	5·37	371·68	230	Sr. 3	338 ..	Leathorne Maid's Chief
Cox A., Mt. Scobie, Jersey (2).										
Tavistock Lassie ..	18458	18.4.33	27½	8,316	5·27	438·31	350	Mature	370, 497 ..	Audrey's Prince of Banyule
Tavistock Milkmaid 2nd ..	28612	20.4.33	23½	7,903	4·94	390·56	350	Mature	203, 315, 368	Duke of Pendennis
Tavistock Northern Queen..	42134	21.4.33	11½	3,856	5·84	225·36	230	Jr. 2	.. ..	Corrong Northern King
Crawford, Mrs. E., Yinnar, Jersey (2).										
Turro Park Eminent Duchess	33240	11.4.33	10	7,077	5·78	403·79	250	Sr. 2	376 ..	Aveley Drummer
Wompini Sweet Marie ..	42573	26.5.33	15	5,726	5·72	327·31	290	Sr. 3	.. ..	Brucevale Bright Star
Davies, J. W., Coalville, Jersey (0).										
Bray Tor Vanity	37198	16.4.33	10	2,658	5·40	140·58	250	Sr. 2	270 ..	Pansy's Chief of Leathorne
Day, E., Penshurst, Jersey (1).										
Viewpoint Sunlight ..	28643	23.4.33	17½	7,107	5·39	382·82	330	Sr. 4	242, 384 ..	Bracondale First Choice
Dee, J., North Clyde, Jersey (1).										
Clydevale Daffodil ..	39292	31.3.33	16	5,112	6·01	307·37	230	Jr. 2	.. ..	Staghorn Master's Defiance
Department of Agriculture, Burnley, Jersey (2).										
Victoria Flirt	33272	11.4.33	20½	5,973	6·53	390·26	270	Jr. 3	359 ..	Victoria Jack Tar
Victoria Venus	33237	14.4.33	20	6,795	6·40	435·00	270	Jr. 3	288 ..	Victoria Jack Tar
Department of Agriculture, Werribee, Friesian (3).										
Victoria Chorus Girl ..	3759	9.4.33	31½	10,937	3·72	407·13	230	Jr. 2	.. ..	Dominion Oakdale
Victoria Streaky Patch ..	3769	3.5.33	38½	11,085	3·60	399·08	230	Jr. 2	.. ..	Dominion Oakdale
Victoria Lean Patch ..	1705	11.5.33	27	15,395	3·49	537·74	350	Mature	326, 306, 577, 506, 700, 592, 511	Victoria Joe Patch
Department of Agriculture, Werribee, Red Poll (2).										
Victoria Village Belle ..	1522AA	15.4.33	35½	10,798	4·24	458·33	350	Mature	357, 402, 394, 423	Belligerent
Victoria Court Belle ..	2039AA	16.4.33	21½	6,593	4·51	297·60	330	Sr. 4	169, 284 ..	Victoria Vice Regal
Victoria Amaranth ..	3003A	24.4.33	21½	6,656	4·31	286·68	290	Sr. 3	248 ..	Victoria Vice Regal
Victoria Greta	3023A	26.4.33	21½	7,599	4·49	340·85	290	Sr. 3	256 ..	Victoria Vice Regal

* 240 days in test.

STANDARD HERD RECORDS—*continued.*

Name of Cow.	Herd Book No.	Date of Calving.	Milk last day of Test. lb.	Milk. lb.	Average Test.	Butter Fat. lb.	Standard required.	Class.	Previous Yields of Butter Fat.	Sire.
Desmond, J. J., Rochester, Jersey (2).										
Macroom Lovebird ..	40854	10.4.33	21½	6,114	5·42	331·36	230	Jr. 2	.. ..	Belgonia Battery
*Macroom Beauty 3rd ..	C.R.	22.4.33	4	2,430	5·52	134·19	230	Jr. 2	.. ..	Macroom Bellboy
Macroom Ellen 2nd ..	Vol. XXI.	18.6.33	17	5,352	5·32	284·72	230	Jr. 2	.. ..	Belgonia Battery
Dobson, R. J. M., Acheron, Jersey (1).										
Wattle Grove Judith ..	28666	17.6.33	18	6,744	5·08	342·89	330	Sr. 4	293, 435 ..	Alert of Farringdon
Dookie Agricultural College, Dookie, Ayrshire (4).										
Dookie Susan	23675	16.5.33	30½	10,970	3·91	428·57	330	Sr. 4	328, 432 ..	Dookie Pater
Dookie Posey	22688	24.5.33	24	7,751	3·95	306·54	350	Mature	362, 399, 414	Dookie Lovelace
Dookie Lily	23669	7.6.33	26	7,936	4.20	332·95	290	Sr. 3	305 ..	Dookie Pater
Dookie Dora	23666	21.6.33	23	8,501	4·24	360·44	290	Sr. 3	336 ..	Longerenong Laurie
Dookie Flora	17776	26.6.33	24	10,148	4·03	409·15	350	Mature	317, 439, 432, 473	Majestic of Burwood
Downie Bros., Longwarry South, Ayrshire (1).										
Glen View Marie 2nd ..	21612	8.5.33	8	4,464	4·48	199·97	330	Sr. 4	215 ..	Gowrie Park Dairy Boy
Glen View Topsy 4th ..	Vol. XXVI.	11.6.33	4½	4,604	4·48	206·15	230	Jr. 2	.. ..	Gowrie Park Standard Bearer
Glen View Betty 3rd ..	C.R.	17.6.33	14½	6,887	4·27	293·93	250	Sr. 2	.. ..	Gowrie Park Standard Bearer
Ducat, P. J., Ardmona, Jersey (0).										
*Airlie Isla 4th	37294	16.4.33	4	3,173	5·08	161·31	290	Sr. 3	212 ..	Maybe of Banyule
Dwyer, G., Balwyn, Jersey (0).										
Shoreham Linda	23117	3.6.33	18½	5,378	6·38	343·01	350	Mature	194, 336, 346, 398	Monica 4th's Lad of King's Vale
Earle, S. N., Clyde, Jersey (0).										
Benguella Ritakin 2nd ..	C.R.	27.4.33	5	3,668	5·77	211·63	250	Sr. 2	.. ..	Benguella Sunrise
Benguella Hope 2nd ..	25858	9.5.33	13½	4,793	5·32	254·85	330	Sr. 4	122 ..	Flowers King of Benguella
Beauty 6th of Somerville ..	11484	28.5.33	14	5,858	4·15	243·35	350	Mature	265, 358, 310, 288	Cream Boy of Somerville
Benguella Faith	C.R.	23.6.33	5½	4,134	5·90	243·77	250	Sr. 2	.. ..	Benguella Sunrise
Benguella Hope	25857	26.6.33	10	6,000	4·58	274·85	350	Mature	241, 337 ..	Kentas King of Somerville
Emmett, W. H., Stanhope, Jersey (0).										
Tavistock Molly 2nd ..	26034	17.5.33	9½	5,636	4·62	260·66	350	Mature	284, 335 ..	Mable's Lad of Tavistock
Enders, N. H., Stanhope, Jersey (3).										
Myra of the Wattles ..	12917	24.5.33	18	9,819	5·02	492·92	350	Mature	592, 619, 633, 539, 598	Laddie II. of Banyule
The Wattles Romany Girl ..	37349	2.6.33	18	8,355	5·52	461·35	270	Jr. 3	394 ..	Prince of The Wattles
The Wattles Snowflake ..	33991	22.6.33	24½	9,567	5·14	491·57	290	Sr. 3	339, 448 ..	Prince of The Wattles
Evans, A., Heywood, Jersey (3).										
Velveteen 11th of Banyule..	21438	9.4.33	25	8,717	4·56	397·91	350	Mature	426, 316, 425	Wotton Airman (Imp.)
Rosemont Peerless 3rd ..	33331	21.4.33	23	6,909	5·73	395·72	330	Sr. 4	312 ..	Rosella 2nd Noble of R.
Glenaire Silvermine 2nd ..	39855	30.4.33	N.O.C.	4,565	5·57	254·40	230	Jr. 2	.. ..	Glenaire Soprano's King
Boronia Farm Chalcedony ..	38997	1.6.33	N.O.C.	4,389	5·00	219·37	230	Jr. 2	.. ..	Boronia Farm Bonnie Chief
Fairchild and Clutterbuck, Tinamba, Jersey (1).										
Vaucluse Tilly	37366	23.5.33	20	6,986	5·63	393·33	250	Sr. 2	.. ..	Handsome Boy 9th of Jerseyholm
Findlay, T. R., Leitchville, Jersey (1).										
Leven Brae Masterpiece Dulcie	23137	15.6.33	15½	9,840	4·88	480·54	350	Mature	307, 318, 396, 431, 497, 543	Werribee Fancy's Masterpiece
Fixter, A., Boisdale, Guernsey (0).										
Melbourne Butterfly ..	3627	9.4.33	12½	5,381	4·54	244·48	270	Jr. 3	230 ..	Melbourne Sandboy 6th
Fixter, W. and Son, Boisdale, Jersey (1).										
Olivedale Jewel	34007	9.4.33	10½	5,694	6·00	341·51	290	Sr. 3	219 ..	Studleigh Dandy
Foster Bros., Boisdale, Jersey (4).										
Boisdale Countess 2nd ..	37384	22.5.33	13	5,147	5·72	294·20	270	Jr. 3	251 ..	Boisdale Emperor
Boisdale Countess ..	33345	29.5.33	18½	6,906	5·85	404·07	310	Jr. 4	214, 375 ..	Starbright's Prince of Glen Iris
Boisdale Brunette 3rd ..	38942	5.6.33	10	4,805	5·28	253·69	230	Jr. 2	.. ..	Gladiator of Springhurst
Boisdale Marge	38946	7.6.33	10	4,158	5·82	242·09	230	Jr. 2	.. ..	Gladiator of Springhurst
Fraser, G. A., Addington, Ayrshire (3).										
Craigielea Flora	17683	6.4.33	15	8,032	4·40	353·36	350	Mature	326, 368 ..	Petunia's Prince of Gleneira
Glengowrie Elva	Vol. XXVI.	6.4.33	16	6,642	4·18	277·69	230	Jr. 2	.. ..	Glengowrie Bold Baron
Bonnie Doon Maisie ..	21061	3.5.33	18½	6,478	4·59	297·35	270	Jr. 3	.. ..	Carlo of The Valley
Garden, A., Swan Hill, Red Poll (0).										
Victoria Courtesy.. ..	3016A	9.5.33	12	4,007	4·66	186·80	230	Jr. 2	.. ..	Dominion Bright Belgian
Gay, R. G., North Devon, Jersey (2).										
Elm Grove Daphne ..	39640	11.5.33	19½	6,033	5·53	333·68	230	Jr. 2	.. ..	Melrose Butterman
Elm Grove Milkmaid ..	34022	12.5.33	19½	6,050	6·20	375·22	310	Jr. 4	281, 342 ..	Royal Lad of Elm Grove

* 180 days in test.

STANDARD HERD RECORDS—*continued.*

Name of Cow.	Herd Book No.	Date of Calving.	Milk last day of Test. lb.	Milk.	Average Test. lb.	Butter Fat. lb.	Standard required.	Class.	Previous Yields of Butter Fat.	Sire.
Gepp, Sir H. W., Macleod, Jersey (0).										
Strathalan Starlight ..	28935	11.6.33	8	4,190	5·50	230·47	350	Mature	323, 407 ..	Noble Airman of Banyule
Gilchrist, A. J., Koo-wee-rup, Jersey (1).										
Clarendon Eyre Rose Marie 4th	39259	25.4.33	23	6,368	5·66	360·68	230	Jr. 2	.. ..	Clarendon Eyre Eminent's Achievement
Handbury, J. E. and Sons (Home Farm), Toora, Jersey (2).										
Tooravale Princess 7th ..	34056	15.4.33	27	7,725	5·57	430·33	290	Sr. 3	285 ..	Tooravale Goldspeck
Tooravale Princess 10th ..	42260	18.4.33	15½	4,413	4·72	208·10	230	Jr. 2	.. ..	Tooravale Goldspeck
Tooravale Princess 9th ..	C.R.	12.5.33	20½	6,018	5·83	350·69	250	Sr. 2	.. ..	Tooravale Goldspeck
Handbury, J. E. and Sons (Share Farm) Toora, Jersey (2).										
Tooravale Lassie Fowler 12th	42256	6.4.33	13½	4,598	5·11	234·80	230	Jr. 2	.. ..	Tooravale Goldspeck
Tooravale Star	25908	18.4.33	8	4,092	6·24	255·20	350	Mature	261, 299, 327	Welkin of Melrose
Tooravale May 2nd ..	23189	19.6.33	17½	7,043	6·10	359·43	350	Mature	281, 410, 329, 379, 400	Welkin of Melrose
Handley, S. C., Dandenong, Jersey (2).										
Barrowby Queen 2nd ..	38809	21.4.33	19½	5,411	5·29	286·15	230	Jr. 2	.. ..	Grangelea Progress
Barrowby Queen	34057	6·6.33	20	6,761	5.74	388·41	290	Sr. 3	311, 388 ..	Barrowby Prince Jewel
Harrison, F. T. and Sons, Moondarra, Jersey (0).										
Mornmoot May	28556	14.4.33	17½	5,208	5·70	296·67	330	Sr. 4	390 ..	Burnside Banker
Mornmoot Meloa	28893	5.5.33	16	5,093	5·95	302·81	330	Sr. 4	.. ..	Burnside Banker
Harvey, T., Boisdale, Jersey (4).										
Trixie Lass of Edmonton ..	23049	5.4.33	24	7,462	5·42	404·79	350	Mature	332, 394, 400, 474, 501	Big Chief of Glen Iris
Edmonton Vixen ..	23050	7.5.33	32	10,419	5·10	531·53	350	Mature	493, 502, 544, 581	Big Chief of Glen Iris
Jerseyholm Bluebell 9th ..	25394	3.6.33	26	9,042	5·47	494·29	330	Sr. 4	361, 539 ..	Lord Island Fancy of Brucevale
Jerseyholm Kirsty 25th ..	37512	3.6.33	16	6,281	5·79	363·60	250	Sr. 2	235 ..	Werribee Masters Fox
Hastings, R. P., Gisborne, Jersey (0).										
Elderslie Doris	39588	21.5.33	10½	3,845	5.70	219·04	230	Jr. 2	.. ..	Banyule Zool
Haywood, Dr. A. R., Hastings, Jersey (0).										
Moorooduc Nell	33858	22.5.33	6	3,420	6·04	206·42	290	Sr. 3	251, 352 ..	Aeronaut of Banyule
Henderson, R. and Son, Macorna, Ayrshire (1).										
Ripon Lea Bloom ..	24256	21.6.33	16½	5,086	5·04	256·50	230	Jr. 2	.. ..	Cathcart Lloyd
Henderson, W. (Home Farm), Grassmere, Ayrshire (7).										
Carracoorte Bunty 17th ..	24685	8·4·33	12	5,786	4·84	280·14	230	Jr. 2	.. ..	Blue Bells Pride of Glencourt
Carracoorte Blanche 10th ..	24676	15·4·33	9½	5,397	4·73	255·25	230	Jr. 2	.. ..	Blue Bells Pride of Glencourt
Sparrovale Jane	16666	17.4.33	4½	4,902	4·02	196·82	350	Mature	273, 349, 225, 370	Scottish Fame of Gowrie Park
Carracoorte Balm 8th ..	17436	20.4.33	10	6,270	4·36	273·45	350	Mature	280, 306, 385, 358, 402	Donald of Sparrovale
Carracoorte Fennella 16th ..	24689	23.4.33	9	5,682	4·30	244·19	230	Jr. 2	.. ..	Blue Bells Pride of Glencourt
Carracoorte Fuchsia 9th ..	24691	24.4.33	9½	4,991	5·10	254·71	250	Sr. 2	.. ..	Blue Bells Pride of Glencourt
Carracoorte Balm 16th ..	24673	13.5.33	11	5,543	4.76	263·68	230	Jr. 2	.. ..	Blue Bells Pride of Glencourt
Carracoorte Iris 10th ..	19695	15.5.33	8½	6,215	3·61	224·33	330	Sr. 4	147 ..	Leader of Cathcart
Carracoorte Brownie 22nd ..	24681	8.6.33	6	4,718	4·28	202·01	230	Jr. 2	.. ..	Gertie's Producer of Carracoorte
Carracoorte Viola 22nd ..	24712	11.6.33	8½	4,980	5·04	250·84	250	Sr. 2	.. ..	Carracoorte Pilot
Carracoorte Filpail 20th ..	24690	20.6.33	9½	6,066	4·45	269·96	230	Jr. 2	.. ..	Carracoorte Lochiel
Henderson, W. (Share Farm), Dennington, Ayrshire (0).										
*Carracoorte Betty ..	22585	20.5.33	4	4,410	4·62	203·91	350	Mature	183, 226, 278	Maxwell of Sparrovale
Hercus, T. B., Hayanmi, Jersey (3).										
Mologa Cherry	37558	16.4.33	30	7,727	5·68	438·62	290	Sr. 3	434 ..	Mologa Admiral
Mologa Jessie 2nd ..	23211	24.5.33	31	9,032	4·79	433·01	350	Mature	491 ..	Delight of Melrose
Mologa Lass	Vol. XXI.	8.6.33	17	5,234	4·88	255·16	230	Jr. 2	.. ..	Belgonia Hinkler
Hore, A. J., Horefield, Illawarra, Shorthorn (2).										
Glengowrie Milkmaid 6th ..	Vol. 4 AISHB	18.5.33	11	6,126	3·56	218·07	230	Sr. 2	.. ..	Justice of Greyleigh
Waughope Betty 5th ..	Vol. 4 AISHB.	25.5.33	18½	7,034	3·29	231·33	230	Jr. 2	.. ..	Glencoe of Greyleigh
Lynnwood Diamond 2nd ..	Vol. 4 AISHB.	25.5.33	13½	6,659	4·75	316·27	250	Sr. 2	.. ..	Jumbo of Beauna Vista
Aralabrad Doris	16858	11.6.33	4	8,150	3·81	310·27	350	Mature	.. ..	Dooley of Darbalara

* 210 days in test.

Standard Herd Records—*continued.*

Name of Cow.	Herd Book No.	Date of Calving.	Milk last day of Test. lb.	Milk.	Average Test. lb.	Butter Fat. lb.	Standard required.	Class.	Previous Yields of Butter Fat.		Sire.
Hore, L. G., Horefield, Illawarra, Shorthorn (2).											
Kurrawong Lottie 7th ..	Vol. 4 AISHB.	24.4.33	12½	6,453	3·81	245·60	230	Jr. 2	..	..	Standard of Cosey Camp
Cheery of Kimo	16928	28.4.33	14	7,547	4·02	303·50	350	Mature	..	..	Doncaster of Darbalara
Virginia 3rd of Horefield ..	11673	3.6.33	13½	5,744	4·44	255·18	250	Sr. 2	..	..	Colmar of Aralabrad
Rosemont Lady 8th ..	Vol. 4 AISHB.	12.6.33	11	6,110	3·71	226·39	230	Jr. 2	..	..	Merry Count of Berry
Horefield Rita	Vol. 4 AISHB.	16.6.33	15	6,365	4·13	262·79	270	Jr. 3	298	..	Colma 2796
Kimo Virginia 6th ..	2792	19.6.33	16	7,400	4·07	301·14	330	Sr. 4	169	..	Doncaster of Darbalara
Hore, M. T., Horefield, Friesian (1).											
Elmar Floris	App. Vol. 12	18.4.33	21	6,263	3·99	249·60	230	Jr. 2	..	..	Greenvale Oakwood Posch
Huffer, J. A., Gormandale, Jersey (1).											
Glen Valley Waverley Lass 2nd	24405	17.5.33	20	6,300	5·93	373·84	350	Mature	353, 394, 456, 456		Top Note of Glen Valley
Hutchinson, H. McD., Yan Yean, Jersey (1).											
Melrose Graceful Duchess 48th	40974	29.4.33	18½	5,946	6·31	375·17	230	Jr. 2	..	..	Melrose Clementine 2nd's Masterpiece
Hutchinson, J. and Sons, Somerville, Jersey (1).											
Somerville Northern Princess	23226	21.4.33	39	11,757	5·28	620·69	350	Mature	413, 423, 614		His Majesty of Somerville
Itzerott Bros., Heathcote, Jersey (7).											
Five Gums Linaria ..	34115	23.4.33	26	8,871	5·83	517·15	290	Sr. 3	387	..	Staghorn Clementine's Masterpiece II.
Five Gum's Linaria 2nd ..	37634	4.5.33	18	6,924	6·16	426·48	250	Sr. 2	311	..	Staghorn Clementine's Masterpiece II.
Five Gum's Fragrance ..	37632	6.5.33	16	6,907	5·68	392·38	250	Sr. 2	262	..	Staghorn Clementine's Masterpiece II.
Five Gum's Fancyette ..	37631	7.5.33	16	5,780	6·57	379·50	250	Sr. 2	335	..	Staghorn Clementine's Masterpiece II.
Five Gum's Primrose 2nd ..	39747	2.6.33	17½	5,530	6·59	364·64	230	Jr. 2	..	..	Staghorn Clementine's Masterpiece II.
Five Gum's Phlox ..	39746	4.6.33	22	7,040	6·04	425·07	250	Sr. 2	..	..	Staghorn Clementine's Masterpiece II.
Five Gum's Goldfinch ..	39745	14.6.33	25½	9,133	4·92	449·14	250	Sr. 2	..	..	Staghorn Clementine's Masterpiece II.
Keonig Bros., Mooroopna, Ayrshire (1).											
Borinya Dulcie	C.R.	13.5.33	15	6,866	3·89	266·94	250	Sr. 2	..	..	Oakbank Wireless
Lade, A., Alexandra, Jersey (0).											
Hythe Lilac	37713	31.3.33	13	4,593	4·97	228·38	250	Sr. 2	281	..	Alert of Farringdon
Hythe Lively	Vol. XXI.	3.5.33	10½	2,870	4·65	133·48	230	Jr. 2	..	..	Alert of Farringdon
Le Noury, E., Werribee South, Guernsey (1).											
Werribee Camilla's Darling..	3481	1.6.33	15	5,543	4·74	263·01	230	Jr. 2	..	..	Camilla's Majestic of Maple Lodge
Leslie T., Sale, Jersey (3).											
Dunrossness Hyacinth ..	39549	30.4.33	24½	6,431	4·54	292·12	230	Jr. 2	..	..	Banyule Velometer
Hibiscus of Aveley ..	13218	10.6.33	14	11,420	4·17	475·66	350	Mature	303, 300, 432, 455, 554		Alloy of Banyule
Summer Hill Blonde ..	29009	15.6.33	37	11,864	4·70	557·67	350	Mature	310, 410, 527		Royal Reserve of S.
Longerenong Agricultural College, Dooen, Ayrshire (0).											
Longerenong Acacia Elata..	Vol. XXVI.	9.4.33	4	4,808	4·24	203·88	230	Jr. 2	..	..	Longerenong Baron
Longerenong Golden Wattle	20483	10.4.33	N.O.C.	5,781	5·08	293·84	350	M.	270, 272, 309, 280		Lily's Lad of Holly Green
*Longerenong Acacia ..	21905	28.5.33	4	4,970	4·31	214·19	350	M.	289, 253, 238, 329		Lily's Lad of Holly Green
Lyon, C. G., Heidelberg, Jersey (5).											
Silvermine 42nd of Banyule	21435	2.4.33	20½	6,516	5·70	371·38	350	Mature	344, 406, 510, 490		Wotton Airman (Imp.)
Banyule Hawthorn 15th ..	25458	17.4.33	20½	8,319	4·94	410·83	350	Mature	394, 451	..	Banyule Air Lord
Kameruka Haughty ..	40468	20.4.33	19½	5,159	5·64	290·88	250	Sr. 2	..	..	Retford Golden Thorn
Banyule Tiddlewinks 7th ..	29038	27.5.33	18	5,723	5·36	306·90	290	Sr. 3	392	..	Superstrain of Banyule
Banyule Silvermine 76th ..	37780	5.6.33	11	4,035	5·44	219·43	230	Jr. 2	..	..	Banyule Airo
Banyule Ettie 14th ..	34186	9.6.33	16	6,306	5·18	326·81	250	Sr. 2	..	..	Superstrain of Banyule
Lyon, W. H., Sale, Jersey (1).											
Avon Daphne 4th ..	38731	1.5.33	19	6,170	5·73	353·38	330	Sr. 4	..	..	Jessie 13th's Count of Melrose
Macaulay, C. W., Rochester, Jersey (1).											
Taranah Daphne 2nd ..	C.R.	9.4.33	13	3,591	5·33	191·43	230	Jr. 2	..	..	Duke of Invermay
Taranah Fashion ..	37856	4.5.33	13	5,286	5·45	288·22	230	Jr. 2	233	..	Duke of Invermay

* 240 days in test.

Standard Herd Records—*continued.*

Name of Cow.	Herd Book No.	Date of Calving.	Milk last day of Test. lb.	Milk.	Average Test. lb.	Butter Fat. lb.	Standard required.	Class.	Previous Yields of Butter Fat.	Sire.
McClelland, Miss C. E., Tunstall, Jersey (1).										
Peggy of the Elms ..	21446	3.4.33	20	6,837	4·50	307·85	350	Mature	237, 313, 357, 278, 418	Relbia's Nap of Austral Park
The Elms Patricia ..	37797	4.5.33	17½	6,039	4·97	299·98	270	Jr. 3	277 ..	Kyora Defenders Volunteer
McCosh, S. J., Wandin, Jersey (1).										
Trumpet Daffodil of Goronga Farm	21597	11.4.33	4	3,981	4·96	197·36	350	Mature	269, 345, 306, 223	Trumps of Banyule
Kara Tex	34169	29.4.33	13	5,599	5·48	307·08	250	Sr. 2	310 ..	Karalee Volunteer
McDougall, J., Byaduk, Jersey (3).										
Parkview Daisy	34204	12.4.33	11½	4,281	4·91	210·09	270	Jr. 3	192 ..	Prince of Parkview
Parkview Colleen ..	24477	27.4.33	16½	7,629	4·67	356·17	350	Mature	295, 325, 337, 466	Cream Lad of Fairview
Parkview Audrey.. ..	41511	11.6.33	9½	6,203	4·65	288·31	250	Sr. 2	.. ..	Prince of Parkview
Parkview Mayflower ..	24479	17.6.33	10½	7,098	5·73	406·61	350	Mature	326, 330, 369	Cream Lad of Fairview
McErvale, I. and Sons, Camperdown, Jersey (2).										
Cumnock Fancy Curio ..	39487	10.4.33	18½	6,039	5·07	305·94	290	Sr. 3	235 ..	Cumnock Fancy Masterpiece
Glenfield Tottie	29056	10.4.33	15	5,450	4·80	261·70	330	Sr. 4	255 ..	Jubilee Fancy Light
Carranballac Lady Carson's Fancy	29054	20.4.33	18½	6,699	5·18	346·84	350	Mature	351, 379, 373	Sir Fancy Madeira of Werribee
Cumnock Lone Girl ..	C.R.	10.5.33	19	6,761	5·01	338·51	250	Sr. 2	.. ..	Cumnock Fancy Masterpiece
McInnes, A. A., Gunbower, Dairy Shorthorn (1).										
Lockness Roseleaf ..	Vol. 1 DSHBA.	27.6.33	11½	6,452	4.32	250·78	250	Sr. 2	.. ..	Royal Duke of Derrimut 28th
McNabb and Son, Irrewillipe East, Jersey (10).										
Avalon Noble's Pansy 3rd ..	36833	23.4.33	13	4,461	6·58	293·75	250	Sr. 2	398 ..	Noble of Avalon
Maxon Goldfinch	Vol. 21	30.4.33	18½	6,215	5·85	363·33	250	Sr. 2	371 ..	Avalon Noble 8th
Maxon Noble's Daisy ..	34224	1.5.33	11½	5,442	6·23	339·08	290	Sr. 3	222, 379 ..	Avalon Noble 8th
Maxon Count's Lodestone ..	40932	2.5.33	12	4,911	6·95	341·33	230	Jr. 2	.. ..	Maxon Count Graceful
Maxon Lady Linnacre ..	29075	14.5.33	18½	7,517	5·30	398·23	330	Sr. 4	250, 340, 401	Chloe's Mercedes Chief of Glen Iris
Maxon Noble's Pansy ..	29078	24.5.33	18	6,056	5·60	339·39	350	Mature	334, 396 ..	Noble Avalon
Maxon Count's Pansy ..	40933	25.5.33	14	4,788	5·98	286·23	230	Jr. 2	.. ..	Maxon Count's Graceful
Maxon Noble's Ranunculus	34226	25.5.33	18½	6,792	5·04	342·63	290	Sr. 3	225, 372 ..	Avalon Noble 8th
Maxon Noble Comfrey ..	34223	26.5.33	19	6,870	5·13	352·73	290	Sr. 3	287, 394 ..	Avalon Noble 8th
Maxon Lady Linnacre 2nd..	37853	26.5.33	16	5,625	5·48	308·02	270	Jr. 3	283 ..	Avalon Noble 8th
Maxon Tiare	40939	26.5.33	12	4,265	5·64	240·37	230	Jr. 2	.. ..	Maxon Mercedes Chief
Graceful Duchess 25th of Melrose	11778	6.6.33	17	6,827	4·99	340·97	350	Mature	240, 280, 416	Golden Fern's Viscount (Imp.)
Mailer, Dr. R., Tallygaroopna, Jersey (3).										
Maveroo Dewdrop 2nd ..	37885	25.4.33	30	8,564	5·57	477·14	250	Sr. 2	307 ..	Wompini Royal Duke
Pearl's Girl of Coolwoola ..	19971	25.4.33	42½	12,486	5·66	707·14	350	Mature	345, 389, 453, 546	Mercedes Golden Prince of Glen Iris
Maneroo Daisy 4th Buttercup	33494	9.5.33	25½	9,143	5·20	475·06	330	Sr. 4	302, 440 ..	Uranus of Aveley
Marshall, M., Myrtlebank, Jersey (2).										
Hewick Bella	37901	17.5.33	20½	7,424	5·25	389·51	250	Sr. 2	333 ..	Banyule Velometer
Hewick Madeira Starbright	40215	31.5.33	17	5,114	4·78	244·32	230	Jr. 2	.. ..	Brucevale Lord Madeira
Marshman, A. R., Archie's Creek, Jersey (1).										
Forgan Gem	25558	5.5.33	10	6,862	5·31	364·03	350	Mature	377, 354, 356	Chorus Boy of Kilburn
Forgan Charm	23310	28.5.33	10	4,800	5·37	257·65	350	Mature	334, 357, 349, 326	Chorus Boy of Kilburn
Meaklim Bros., Mooroopna, Milking Shorthorn (0).										
Drumniel Duchess 2nd ..	Vol. 1 DSHBA.	7.5.33	22½	7,511	4·19	314·35	350	Mature	.. ..	Bounty of Darbalara
Drumniel Snowdrop ..	Vol. 1 DSHBA.	25.5.33	25	7,097	3·68	261·50	270	Jr. 3	.. ..	Reformer of W.P.
Mesley, T., Dalyston, Jersey (2).										
Warenda Meadow Queen ..	17805	1.4.33	22	7,218	5·13	370·29	350	Mature	322, 313, 343, 387, 477, 362	Kewpie of Warenda
Warenda Gazelle 8th ..	33519	18.6.33	25½	9,644	4·69	452·47	350	Mature	416 ..	Warenda Snap
Mitchell, R. H., Linton, Jersey (1).										
Clifford Farm Dawn ..	34263	11.4.33	24½	8,502	5·98	508·36	290	Sr. 3	.. ..	Clifford Farm Eliminator
Moore, J. and Co., Yarram, Jersey (1).										
Tooloonook Trixie 8th ..	37959	7.4.33	4	5,418	5·04	272·83	290	Sr. 3	292 ..	Heroic of Somerville
Tooloonook Beauty 5th ..	37952	2·5·33	14½	5,155	5·40	278·23	290	Sr. 3	246 ..	Beauty 4th's Command of Somerville
Tooloonook Trixie ..	33547	13.5.33	4	6,474	5·09	329·39	350	Mature	259, 480 ..	Lydia's King of Yaralla
Tooloonook Lilac Bloom 2nd	Vol. XXI.	20.6.33	12	4,686	6·44	301·85	250	Sr. 2	292 ..	Heroic of Somerville

STANDARD HERD RECORDS—*continued.*

Name of Cow.	Herd Book No.	Date of Calving.	Milk last day of Test. lb.	Milk. lb.	Average Test.	Butter Fat. lb.	Standard required.	Class.	Previous Yields of Butter Fat.	Sire.
Muhleback Bros., Batesford, Jersey (0).										
Strathey Golden Queen ..	33556	19.5.33	19½	6,206	4·19	260·20	290	Sr. 3	307 ..	Strathey Golden Boy
Strathey Lady	37968	20.6.33	15	5,882	4·61	271·24	350	Mature	237, 246, 221, 250	Admiral 5th of St. Albans
Murray, H. C., Murrabit West, Jersey (2).										
Pretty Lass of Blackwood Valley	17833	5.4.33	20	7,650	5·40	413·26	350	Mature	402 ..	Retford Mourier Lad
Colber Jessie	38231	6.5.33	24	6,644	5·20	345·52	270	Jr. 3	275, 327 ..	Linden Grey Laddie
Moorunduden Sweetheart ..	29194	8.4.33	16	5,034	5·44	273·72	330	Sr. 4	.. ..	Sweet Parial 2nd's Lad of Boorene
Moorunduden Sweet Pet ..	29193	8.5.33	12½	3,084	5·26	162·21	310	Jr. 4	330 ..	Sweet Parial 2nd's Lad of Boorene
Nicholas, A. M., Sherbrooke, Jersey (2).										
Preston Fernleaf's Princess..	41629	2.4.33	26½	6,838	4·33	295·99	230	Jr. 2	.. ..	Preston Merry King
Preston Morocco Fairy ..	41635	6.5.33	15	5,039	6·18	311·60	230	Jr. 2	.. ..	Preston Merry King
Nicholas, A. M., Shoreham, Jersey (2).										
Jubilee Crocus	23389	1.4.33	18	7,512	5·55	416·57	350	Mature	461 ..	Goddington Winks 6th (Imp.
Selsey Lady Viola ..	41946	30.5.33	13½	5,882	5·80	340·96	230	Jr. 2	.. ..	Jubilee Asterlight
Jubilee Roseleaf	33668	5.6.33	14½	6,083	5·54	337·29	350	Mature	.. ..	Jubilee Whatlight
Jubilee Excallonia ..	40426	15.6.33	9½	3,340	6·32	211·22	230	Jr. 2	.. ..	Jubilee Wheatenlight
Nilson, P. O., Tynong, Jersey (1).										
Glen Iris Nasturtium ..	18790	16.5.33	18½	6,392	5·23	334·29	350	Mature	331, 234 ..	Mercedes Sweet Duke of Glen Iris
Gladys Park Lettie's Bluebell	37990	10.6.33	16	6,446	4·54	292·44	250	Sr. 2	248 ..	Werribee Bluebell's Masterpiece
Noble T. M. and Son, Maffra, Jersey (4).										
Finchley Handsome Girl ..	39740	4.5.33	19	5,519	7·49	413·39	230	Jr. 2	.. ..	Werribee Lord Burnham
Finchley Handsome Lady ..	37993	21.5.33	16½	6,260	7·01	438·82	270	Jr. 3	420 ..	Werribee Lord Burnham
Aveley Lilian 2nd ..	26199	27.5.33	23	9,165	5·20	476·61	350	Mature	291, 442 ..	Magnet of Aveley
Finchley Lady Patch ..	C.R.	31.5.33	20	6,539	5·51	360·02	230	Jr. 2	.. ..	Werribee Lord Burnham
Nolte, E. H., Merino, Jersey (1).										
Nairana Fairy 11th ..	C.R.	30.3.33	14	4,712	4·96	233·53	230	Jr. 2	.. ..	Nairana Gold Song
O'Neill, J., Echuca Village, Jersey (1).										
Fourshells Yvette ..	38349	20.5.33	22½	7,904	6·20	490·06	250	Sr. 2	.. ..	Belgonia Propeller
Orchard, Mrs. L., Graham Vale, Jersey (0).										
*Laura of Jerseyvale ..	24541	7.5.33	4	3,555	4·52	160·61	350	Mature	268, 285, 287, 305	Princess 2nd's Twylish of Grangelea
Jersey Vale Ruth.. ..	Vol. 21	13.6.33	16	3,576	4·85	173·49	250	Sr. 2	258 ..	Princess 2nd's Twylish of Grangelea
Jersey Vale Myra ..	40358	16.6.33	14	4,324	4·31	186·22	250	Sr. 2	199 ..	Princess 2nd's Twylish of Grangelea
Osborne, H. M., Poowong East, Jersey (1).										
Conaire Prim	39332	3.6.33	8	3,866	5·21	201·27	250	Sr. 2	.. ..	Banyule Macon
Grangelea Bunty 2nd ..	24272	5.6.33	4½	5,924	5·73	339·47	350	Mature	357, 314, 345	Golden Twylish
Conaire Rosebud	39334	7.6.33	13	5,174	5·00	258·71	230	Jr. 2	.. ..	Banyule Macon
Overend, A. C. (Mrs.), Sale, Jersey (0).										
Bon Accord Meg ..	C.R.	15.4.33	11	3,498	4·72	164·99	230	Jr. 2	.. ..	Bon Accord John
Bon Accord Bertha ..	34273	4.5.33	14½	4,629	4·73	228·01	290	Sr. 3	264, 285 ..	Bon Accord David
Bon Accord Madam Pompadour	29284	15.5.33	20	5,394	4·93	266·08	350	Mature	227, 330, 373	Bon Accord Torus
Padgett, I., Werribee, Friesian (1).										
St. Alban's May	[2596	19.4.33	26	12,704	3·45	438·33	350	Mature	382, 397, 435, 497	Eco Sylv King Pontiac
Parker Bros., Seymour, Ayrshire (1).										
Cathcart Linette	19718	12.6.33	17½	9,368	4·31	403·46	350	Mature	259, 407 ..	Poppy's Advance of Ben Kell
Pearson, J., Nerrena East, Jersey (0).										
Glenmoor Heather ..	38039	20.5.33	14½	6,058	4·33	262·12	350	Mature	288, 365 ..	Peerless 19th's Prince of Melrose
Pollard, C. F., Wodonga, Jersey (1).										
Flighty 4th of Milksham Park	18731	9.4.33	22	7,844	5·77	452·37	350	Mature	456 ..	Waverley Lass 2nds Viscount of Melrose
Poole, Mrs. M. A., Caldermeade, Ayrshire (1).										
Ryeland's Pride ..	20718	15.5.33	19	6,658	5·17	344·00	350	Mature	209, 266, 316	Baron of Glen Afton
Ryeland's Pearl ..	16599	26.5.33	14	8,469	4·54	384·27	350	Mature	310, 296, 372, 399	Clairmont Boaster
Ryeland's Fairy ..	20714	8.6.33	7	7,011	4·91	344·16	350	Mature	292, 315 ..	Ryeland's William
Powell, Mrs. K. E., Camperdown, Jersey (3).										
Carson's Pet of Carranballac	17412	7.4.33	15½	4,800	5·12	245·55	350	Mature	344, 319, 304	Carson of Banyule
Mount Violet Blanchette Bawn	41157	11.4.33	15	5,094	5·38	274·12	230	Jr. 2	.. ..	Carson of Banyule
Mount Violet Lily Bawn ..	41160	21.5.33	14	5,606	4·58	256·67	230	Jr. 2	.. ..	Carson of Banyule
Mount Violet Beauty Bawn	41156	26.5.33	12½	4,172	4·83	201·57	230	Jr. 2	.. ..	Carson of Banyule
Mount Violet Rose Petal ..	38064	27.5.33	14½	5,553	5·06	281·13	290	Sr. 3	298 ..	Chief of Allambie
Mount Violet Neatness ..	41162	16.6.33	9½	4,207	5·52	232·34	230	Jr. 2	.. ..	Mount Violet Maud's Perpetual

* 240 days in test.

Standard Herd Records—*continued.*

Name of Cow.	Herd Book No.	Date of Calving.	Milk last day of Test. lb.	Milk.	Average Test. lb.	Butter Fat. lb.	Standard required.	Class.	Previous Yields of Butter Fat.		Sire.
Poyner, R., Lilydale, Jersey (2).											
Brucevale Island Fancy 2nd	C.R.	30.3.33	16	4,970	4·77	237·24	230	Jr. 2	..	..	Werribee Wyandotte's King
Lilydale Promise ..	34287	25.4.33	19	5,711	5·68	324·14	290	Sr. 3	314	..	Staghorn Promise's Masterpiece
Poynton and Sons, Macarthur, Jersey (1).											
Castlemaddie Icicle ..	23302	10.6.33	8	6,954	5·60	389·74	350	Mature	424	..	King's Bounty of Somerville
Pullar, P. G., Tatura, Friesian (1).											
Goulburn Iona's Sylvia ..	3482	20.6.33	27	12,078	3·65	463·03	350	Mature	..	..	Burnbank Sylvia's Burkyji
Quigley and Bennett, Yinnar, Jersey (1).											
Ellendale Bluebell 2nd ..	23383	11.5.33	20	7,080	4·91	347·72	350	Mature	245, 398, 375, 434		Banjo of Warenda
Linga Longa Banksia 5th ..	40728	18.5.33	11	3,780	6·48	245·07	290	Sr. 3	..	..	Brilliant Dawn of Linga Longa
Belgonia Romany Lass 4th	33638	20.6.33	20	8,423	4·53	381·29	330	Sr. 4	374, 483	..	Aerial of Banyule
Ralph Bros., Moorabbin, Illawarra Shorthorn (1).											
†Lucky 5th of Lemon Grove	11865	15.4.33	..	9,960	4·21	419·52	350	Mature	377	..	Butterson of Lemon Grove
Rankin, W. J., Trafalgar, Jersey (2).											
Marimba Sweet Pearl ..	40918	8.5.33	11	5,657	5·52	312·46	250	Sr. 2	275	..	Marimba Roselind Ideal
Marimba Primrose ..	33612	30.5.33	8½	4,931	5·80	286·06	270	Jr. 2	..	..	Werribee Lord Fancy
Read, J. D., Springhurst, Jersey (10).											
Springhurst Nightshade 3rd	26170	2.4.33	19	7,620	6·38	485·90	350	Mature	361, 372, 442		Starbright's Prince of Glen Iris
Springurst Romneya 3rd ..	29337	2.4.33	18½	6,923	5·76	398·62	290	Sr. 3	442, 517	..	Starbright's Prince of Glen Iris
Springhurst Yarran ..	24570	7·4.33	20	8,370	5·95	497·61	350	Mature	428, 453, 519, 570		Starbright's Prince of Glen Iris
Springhurst Soya ..	38107	8.4.33	21	6,603	5·54	365·51	230	Jr. 2	..	..	Starbright's Prince of Glen Iris
Springhurst Sybil Medick ..	41999	8.4.33	16½	5,255	6·77	355·62	230	Jr. 2	..	..	Bellefaire Seaborn Successor
Springhurst Tomato 2nd ..	26175	25.4.33	22	7,641	6·05	462·35	330	Sr. 4	340, 410, 542		Starbright's Prince of Glen Iris
Tomato of Springhurst ..	18939	23.5.33	30	10,692	5·09	543·80	350	Mature	302, 533, 604, 567, 594, 563		Alloy of Banyule
Springhurst Aconite 3rd ..	33643	3.6.33	21½	6,048	6·26	378·59	270	Jr. 3	407	..	Starbright's Prince of Glen Iris
Aconite of Springhurst ..	21598	5.6.33	31	10,563	5·37	567·45	350	Mature	417, 373, 501, 588		Othman of Springhurst
Springhurst Medick 4th ..	29336	25.6.33	15	6,275	5·94	372·86	290	Sr. 3	301, 414	..	Starbright's Prince of Glen Iris
Rechenberg, J. F., Marshall, Ayrshire (3).											
Camelot Daffodil ..	24664	1.4.33	10½	5,610	4·90	275·15	270	Jr. 3	..	..	Scotswood Adonis Earl
Camelot Roseleaf ..	22582	1.4.33	23½	8,969	4·29	385·19	310	Jr. 4	..	..	Sparrovale Ronald
Camelot Mavis ..	24666	13.4.33	22½	7,373	4·66	343·42	270	Jr. 3	..	..	Scotswood Adonis Earl
Camelot Roberta ..	22581	15.9.33	18	6,522	4·53	295·14	330	Sr. 4	..	..	Sparrovale Ranger
Rentsch, A., Tabor, Illawarra M. Shorthorn (1).											
Allawalla Daisy 7th ..	Vol. 4 A.I.S.H. 13	27.5.33	18½	5,832	4·86	283·57	230	Jr. 2	..	..	Egbert of Allawalla
Rodda, W. G., Warracknabeal, Jersey (2).											
Toolang Carnation ..	36998	28.4.33	16	8,070	4·96	400·12	250	Sr. 2	392	..	Vanilla 2nd of Tavistock
Clover Flat Velveteen 2nd ..	36997	31.5.33	18	7,196	5·31	382·11	350	Mature	413	..	Beau Brummel of Banyule
Ronalds, O., Tarago, Jersey (2).											
Glenwood Lady Lotus ..	38181	24.5.33	22½	7,725	5·49	424·29	310	Jr. 4	428	..	Lotus King of Glenwood
Somerville Heroine 5th ..	38184	15.6.33	26	9,871	4·73	466·66	270	Jr. 3	438	..	Banyule Aeronaut
Ryan and Sons, Pirron Yallock, Illawarra Shorthorn (1).											
*Bona Vista Hope 3rd ..	2851	6.4.33	4	6,645	3·34	221·82	350	Mature	382, 313	..	Jellicoe of Greyleigh
*Basin Banks Birdie ..	2845	8.4.33	4	8,505	3·79	322·30	290	Sr. 3	252	..	Redman of Glenburn
Salesian College, Sunbury, Ayrshire (0).											
*Scotswood Myriad 2nd ..	20746	31.3.33	4	4,410	5·06	223·20	330	Sr. 4	..	..	Bellboy of Oakbank
Schier, A. H., Kernot, Ayrshire (2).											
Scotswood Moonbeam 2nd	Vol. XXVI.	30.3.33	20	5,433	4·04	219·51	230	Jr. 2	..	..	Scotswood Majestic
Scotswood Marchioness ..	Vol. XXVI.	26.4.33	10	3,420	5·07	173·56	230	Jr. 2	..	..	Scotswood Prelate
Glen Afton Gay Girl ..	17947	1.5.33	15	8,716	4·14	361·27	350	Mature	268	..	Donald Scot of Gleneira
Scotswood Fairybelle ..	Vol. XXVI.	5.5.33	11	4,370	4·23	184·99	230	Jr. 2	..	..	Federal of Warrook
Scotswood Madeira 2nd ..	Vol. XXVI.	12.5.33	13	4,104	4·64	190·50	230	Jr. 2	..	..	Scotswood Prelate
Scotswood Miss Dina ..	Vol. XXVI.	17.5.33	15	4,943	4·11	202·97	230	Jr. 2	..	..	Federal of Warrook
Scotswood Lady Vim ..	24341	20.5.33	11	4,129	5·02	207·42	290	Sr. 3	..	..	Federal of Warrook
Scotswood Myra 2nd ..	Vol. 26	10.6.33	14	5,590	4·81	268·72	230	Jr. 2	..	..	Federal of Warrook
Schlipalius, A. J., Kilmany South, Jersey (1).											
Fairbank Princess Ida ..	39702	16.4.33	17	4,695	5·69	267·00	230	Jr. 2	..	..	Wompini Beau Brummel
Fairbank Lass ..	39700	18.5.33	8½	2,822	5·20	146·68	230	Jr. 2	..	..	Fairbanks Victor
Smith, Emery G., Camperdown, Jersey (0).											
Welcome Grange Jewel ..	42471	15.5.33	7½	3,394	6·40	217·24	230	Jr. 2	..	..	Linda 56th's Thorn of King Vale
Bell Vue Radiant ..	38855	20.5.33	8½	4,212	4·80	202·20	230	Jr. 2	..	..	Goldfinder (Imp.)
Blackwood Grove Soprano ..	38931	3.6.33	6	3,022	5·70	172·12	230	Jr. 2	..	..	Blackwood Grove Starlight
Smith, G. and W., Fish Creek, Jersey (2).											
Rydon Belle	41920	20.6.33	20	6,345	5·46	346·70	230	Jr. 2	..	..	Melrose Migrant
Rydon May Queen ..	41926	27·6·33	19½	6,884	5·53	380·75	230	Jr. 2	..	..	Burnside Harmony

* 240 days in test. † 210 days in test.

STANDARD HERD RECORDS—*continued.*

Name of Cow.	Herd Book No.	Date of Calving.	Milk last day of Test. lb.	Milk.	Average Test. lb.	Butter Fat. lb.	Standard required.	Class.	Previous Yields of Butter Fat.	Sire.
Stephens, Dr. F. G., Vermont, Guernsey (1).										
Una of Maple Lodge (Imp.)	32692	24.5.33	18½	7,348	4·18	307·38	250	Sr. 2	.. ..	Sunrise of Maple Lodge
Stoney, W. B., Drouin West, Jersey (1).										
Melview Bonnie ..	33681	3.6.33	10	4,341	5·46	237·20	350	Mature	316 ..	Sunburst of Melrose
Wompini Wildflower ..	33804	15.6.33	15	6,350	5·79	367·71	310	Jr. 4	229, 329 ..	Wompini Noble
Comely Banks Foxglove 2nd	29386	21.6.33	9	5,456	4·96	270·85	350	Mature	297, 269 ..	Twylish of Comely Banks
Sutton, H. and Son, Callignee, Jersey (0).										
Latrobe Hazel	28970	9.6.33	13½	5,546	5·13	284·76	310	Jr. 4	178, 221 ..	Latrobe Molly's Airman
Omatoroa Cream Rose ..	38381	12.6.33	9½	4,439	5·28	234·45	270	Jr. 3	233 ..	Waverley's Count of Glen Valley
Tomasette, B. G., Drouin West, Ayrshire (3).										
Glencorren Heather Belle ..	24954	15.5.33	20	5,834	3·95	230·33	230	Jr. 2	.. ..	Scotswood Michael 2nd
Glencorren Modena ..	21506	16.5.33	19½	8,441	4·37	369·29	310	Jr. 4	320, 389 ..	Scotswood Michael 2nd
Glencorren Mossy ..	24955	9.6.33	14½	6,281	4·28	268·74	230	Jr. 2	.. ..	Scotswood Michael 2nd
Tuckey, J. F., Alberton, Ayrshire (1).										
Tregorland Keen ..	24425	1.6.33	26	8,898	3·97	353·13	290	Sr. 3	280 ..	Gowrie Park Scottish Minstrel
Vagg, E. J., Leongatha, Jersey (1).										
Bonnay Lady's Love ..	29564	7.4.33	21	7,826	6·35	496·78	350	Mature	333, 425, 496, 495	Mona's Duke of Woorayl
Van Brummelen, J. K., Lower Ferntree Gully, Friesian (0).										
Bolero Korndyke Maria ..	C.R.	20.4.33	26	6,704	3·34	224·04	230	Jr. 2	230 ..	St. Alban's Queen's Koondyke II.
Bolero Inka Joy ..	Vol. 12	23.4.33	28	7,013	3·14	220·29	270	Jr. 3	248 ..	St. Alban's Queen's Koondyke II.
Bolero Milkmaid ..	Vol. 12	4.6.33	12½	6,657	3·23	215·35	350	Mature	239, 256 ..	Burnbank Inka Sylvia's Lad
Vaughan Bros., Girgarre, Jersey (4).										
Lynroy Fancy 2nd ..	C.R.	2.6.33	6	4,860	5·02	244·13	230	Jr. 2	.. ..	Sherborne Wyandotte's King
Lynroy Pixie	40835	4·6·33	8	4,017	6·55	262·93	330	Sr. 4	314, 462 ..	Sherborne Wyandotte's King
Lynroy Vanilla	38466	5.6.33	9	6,308	6·02	379·80	250	Sr. 2	370 ..	Sherborne Wyandotte's King
Lynroy Gem 2nd ..	38461	6.6.33	10	6,908	5·53	381·83	290	Sr. 3	325, 370 ..	Sherborne Wyandotte's King
Lynroy Graceful ..	C.R.	12.6.33	16	5,343	5·50	293·72	230	Jr. 2	230 ..	Sherborne Wyandotte's King
Wade, W. J., Stratford, Jersey (1).										
Inverbroom Silver Molly ..	40289	2.4.33	13	3,959	5·54	219·22	230	Jr. 2	.. ..	Economist of Aveley
Hazeldale Ruby 2nd ..	25555	20.6.33	4	7,685	4·89	375·60	350	Mature	294, 326, 252, 422, 448	Dinkum of Banyule
Wallace, A., Bendigo, Jersey (1).										
Preston Bloom	38499	30.5.33	18	6,389	4·61	294·49	290	Sr. 3	243 ..	Preston Pretty Boy
Warragul High School, Red Poll (0).										
Gipps Francesca ..	2876A	14.4.33	13½	3,884	4·21	163·56	230	Jr. 2	.. ..	Gipps Byron
Gipps Lora	2877A	17.4.33	19	5,311	4·33	229·72	290	Sr. 3	219 ..	Gipps Byron
Gipps Parisina	2881A	2.5.33	6½	5,391	4·06	218·83	230	Jr. 2	.. ..	Gipps Byron
Watts, J. S., Stanhope, Jersey (1).										
Kantara Violette ..	26205	3.4.33	28½	8,595	5·43	466·58	350	Mature	305, 403, 498	Ku Ku Fashion Plate
Webb, H. L., Sunbury, Ayrshire (0).										
Holly Green Mermaid ..	20337	9.4.33	10	5,102	4·27	217·89	330	Sr. 4	244, 244 ..	Lily's Goldmine of Holly Green
Holly Green Quiver's Queen	20341	22.4.33	15½	4,425	4·59	203·09	330	Sr. 4	199, 176 ..	Holly Green Gold Coin
Holly Green Quota ..	24026	29.4.33	14½	4,289	4·08	175·04	250	Sr. 2	.. ..	Holly Green Gold Coin
Holly Green Scottish Queen	21776	29.5.33	18½	6,096	3·68	224·54	290	Sr. 3	256 ..	Holly Green Gold Coin
West, J. C., Notting Hill, Illawarra Shorthorn (1).										
Birdie 2nd of the Pines ..	18146	16.4.33	19	8,901	4·39	391·17	350	Mature	282, 387 ..	Hero of Lemon Grove
Crummy 6th of St. Elmo ..	14317	24.4.33	21	8,451	3·94	333·34	350	Mature	289, 403 ..	Duke of St. Elmo
*Mabel 4th of Monana ..	14309	10.5.33	4	5,340	3·84	204·96	350	Mature	277, 337 ..	Admiral of Oakleigh
Wilmot, J., Bullarook, Jersey (1).										
Banyule Silvermine 58th ..	29032	16.5.33	24	6,800	5·63	382·94	310	Jr. 4	308, 435 ..	Superstrain of Banyule
Wilson, D. C., Derrinallum, Jersey (0).										
Melksham Pansy 20th ..	33924	3.4.33	5	3,497	6·15	214·97	290	Sr. 3	299 ..	Royal Duke of Melrose
Ayton Law Fern ..	25654	8.4.33	10	4,320	4·57	197·57	330	Sr. 4	229, 237, 301	Wagga Yambils Goddington Noble
Ayton Law Elaine 2nd ..	38757	12.5.33	4	2,322	5·41	125·62	230	Jr. 2	.. ..	Wagga Yambils Goddington Noble
Ayton Law Fern 3rd ..	38758	23.5.33	4	3,875	4·93	190·87	230	Jr. 2	.. ..	Ayton Law Quality 2nd
Wood, Chas. J., Frankston, Jersey (0).										
Clarendon Eyre La Mascotte	24673	4.5.33	15½	4,865	5·07	246·64	350	Mature	305, 404, 394	Eminent's Achievement of Clarendon Eyre
Wood, J. V. M., Heidelberg, Jersey (3).										
Clarendon Eyre Little Buttercup 2nd	29624	7.4.33	27	9,068	5·74	520·68	350	Mature	370, 435, 497	Clarendon Eyre Rose's Eminent
Glenesk Lilac Domino ..	38557	17.5.33	23	6,881	6·07	417·92	310	Jr. 4	306, 334 ..	Clarendon Eyre Rose's Eminent
Clarendon Eyre La Mascotte 7th	Vol. XXI.	20.6.33	21	6,851	4·78	327·56	230	Jr. 2	.. ..	Clarendon Eyre Eminent's Melody
Woodmason, W., Oakleigh, Jersey (1).										
Melrose Jessie 57th ..	40979	9.4.33	13½	4,092	6·21	254·21	230	Jr. 2	.. ..	Melrose Golden Arrow
Xavier College, Kew, Jersey (0).										
Jubilee Eidelweiss ..	33663	21.4.33	13	5,477	5·57	304·96	330	Sr. 4	.. ..	Jubilee Whatlight
Hartland's Echo ..	33452	22.6.33	19	6,965	4·15	289·04	330	Sr. 4	393 ..	Karalee Duke
OMITTED FROM RETURN FOR QUARTER ENDED 31st DECEMBER, 1933.										
Murray, H. C., Murrabit, Jersey (0).										
Moorunduden Lily ..	33557	20.1.33	13	4,104	4·93	202·44	250	Sr. 2	.. ..	Lord Lily 2nd of Meryula

* 240 days in test.

TESTED SIRES

Hereunder is a list of sires one or more of whose progeny in the test for the quarter ended 31st March last yielded 100 lb. butter-fat in excess of that required to qualify for certificate. The quantity of butter-fat required for certificate in the various classes plus the additional 100 lb. is indicated at the top of the several columns, and the figures shown opposite the name of each sire are the yields of butter-fat from individual heifers or cows by that sire.

Name of Sire.	Breed.	Class. Jr. 2 330 lb.	Sr. 2. 350 lb.	Jr. 3. 370 lb.	Sr. 3. 390 lb.	Jr. 4. 410 lb.	Sr. 4. 430 lb.	Mature and over 450 lb.
Alert of Farrington	Jersey	..	..	..	..	421		
Alloy of Banyule	Jersey	..	..	..	..	..	..	544
Avalon Noble 8th	Jersey	..	363					
Aveley Drummer	Jersey	..	409					
Banyule Aeronaut	Jersey	..	..	467				
Banyule Velometer	Jersey	..	390					
Belgonia Battery	Jersey	331						
Belgonia Propeller	Jersey	..	490					
Bellefaire Seaborn Successor	Jersey	356						
Big Chief of Glen Iris	Jersey	..	..	..	..	..	..	532
Burnbank Sylvia's Burkyje	Friesian	..	..	..	..	..	..	463
Burnside Harmony	Jersey	381						
Clarendon Eyre Eminent's Achievement	Jersey	361						
Clarendon Eyre Rose's Eminent	Jersey	..	..	..	..	418	..	521
Clifford Farm Eliminator	Jersey	..	..	..	508			
Curiosity's King of Comely Banks	Jersey	..	..	..	445			
Dominion Oakdale	Friesian	407 399						
*Grangelea David	Jersey	338						
Handsome Boy 9th of Jerseyholm	Jersey	..	393					
His Majesty of Somerville	Jersey	..	..	..	..	..	..	621
Jubilee Asterlight	Jersey	341						
Kings Vale Rosella 11th's Lad	Jersey	..	..	..	..	449		
Ku Ku Fashion Plate	Jersey	..	..	..	..	418	..	521
Laddie II. of Banyule	Jersey	..	..	..	..	..	..	493
Lord Island Fancy of Bruce Vale	Jersey	..	..	..	..	..	494	
Lotus King of Glenwood	Jersey	..	..	..	..	424		
Magnet of Aveley	Jersey	..	..	..	..	..	..	477
Masterpiece (imp.)	Jersey	..	..	..	..	..	..	453
Masterpiece of Bruce Vale	Jersey	..	..	..	..	..	..	495
Maxon Count Graceful	Jersey	341						
Melrose Butterman	Jersey	334						
Melrose Clementine 2nd's Masterpiece	Jersey	375						
Melrose Migrant	Jersey	347						
Mercedes Golden Prince of Glen Iris	Jersey	..	..	..	..	..	..	707
Mologa Admiral	Jersey	..	..	439				
Monas Duke of Woorayl	Jersey	..	..	..	..	..	..	497
Noble of Avalon	Jersey	..	..	..	542			
Othman of Springhurst	Jersey	..	..	..	..	..	..	567
Peer of Lewisham	Jersey	..	..	..	412			
Preston Royal Fancy	Jersey	338						
Scottish Hero of Gourie Park	Ayrshire	340						
Staghorn Clementine's Masterpiece II.	Jersey	365	392 426 380 449 425	517				
Starbright's Prince of Glen Iris	Jersey	366	..	379	399	..	462	498 486
Studleigh Masterpiece	Jersey	..	..	..	550			
Thelma's King 2nd of St. Albans	Jersey	..	..	..	..	449		

* Omitted from list for quarter ended 31st December, 1933.

TESTED SIRES—*continued.*

Name of Sire.	Breed.	CLASS. Jr. 2 330 lb.	Sr. 2. 350 lb.	Jr. 3. 370 lb.	Sr. 3. 390 lb.	Jr. 4. 410 lb.	Sr. 4. 430 lb.	Mature and over 450 lb.
Toorvale Goldspeck	Jersey	..	351	..	430			
Uranus of Aveley	Jersey	..	..	..	..	..	475	
Vanilla 2nd of Tavistock	Jersey	..	400					
Victoria Belligerent	Red Poll	..	..	..	..	..	..	458
Victoria Jack Tar	Jersey	..	..	435 390				
Victoria Joe Patch	Friesian	..	..	..	..	..	..	538
Warenda Snap	Jersey	..	..	..	..	..	..	452
Waverly Lass 2nd's Viscount of Melrose	Jersey	..	..	..	..	..	..	452
Werribee Fancy's Masterpiece	Jersey	..	..	..	..	..	..	481
Werribee Lord Burnham	Jersey	413 360	438					
Werribee Master's Fox	Jersey	..	364					
Werribee Master's Key	Jersey	..	..	..	399	428		
Werribee Northern Masterpiece	Jersey	388	..	..	..	..	..	518
Willow Park Design	Dairy Shorthorn	..	..	..	..	548		
Wompini Royal Duke	Jersey	..	477					

Bacterial Plant Diseases in Victoria

(*Continued from page* 311)

when they had reached a diameter of 3 to 6 mms.; later they grew to 10-20 mms. diameter. Similar spots were produced on orange and wild lemon fruits. On inoculation of a twig of wild lemon symptoms of disease developed slowly, and after two months there was a small brown zone 2 to 3 mms. in diameter surrounding the puncture. Above and below the puncture there was a clear gummy exudate. Infection was also obtained on apricot fruits (Plate VIII.) and on young twigs of coprosma and lilac.

The pathogene was recovered from the above artificial infections.

DISCUSSION.

The description given above of the organism causing black pit disease in Victoria is very similar to that of *P. syringae* (van Hall) Bergey et al., an organism which Miss Bryan(20) and others have shown to be capable of attacking a wide range of plants. The name *P. citriputeale* formerly given to the organism causing black pit of lemons has been discarded in favour of the older name *P. syringae.*

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Stallion Register 1933-34

(Under the Horse Breeding Act 1928)

Part II.—Registrations subsequent to 1st February, 1934.

(For registrations prior to 1st February see Journal for May, 1934.)

Cert. No.	Name.	Age* and Class.	Owner and Address.
1159	Baron Douglas ..	A. D.	T. Bray, St. Arnaud
1161	Baron King ..	A. D.	W. Watts, Kamarooka
1157	Brewan ..	A. T.	W. Woodhouse, Stratford
1145	Capitalist ..	A. D.	A. K. Urquhart, Hexham
1171	Carngham Digger	3 D.	Lewis and Medlow, South Australia
1152	Coast Guard ..	A. D.	A. G. Turnbull, Winnieburn North
1160	Colonel Mac ..	A. D.	L. Taylor, Leitchville
1131	Confidence ..	5 P.	C. O'Neill, Upper Sandy Creek
1151	Dalmores Choice	A. D.	A. G. Turnbull, Winnieburn North
1156	Flash Bute ..	A. D.	State Research Farm, Werribee
1138	Foreman ..	A. D.	C. J. Porter, Cowangie
1153	Globes Image ..	A. L.	J. Ohlm, Gooramadda
1137	Golden Simmer ..	A. P.	M. O'Brien, Hamilton
1143	Harry Lauder ..	4 L.	R. Butler, Newstead
1165	Heir Apparent ..	A. T.	W. T. Cox, Moolort
1134	King Dale ..	A. D.	P. Glenane, Ballarat
1133	Little Maz ..	A. P.	J. B. Ellis, Bairnsdale
1173	Lost Time ..	A. T.	J. E. McBurnie, Toolleen
1172	Lynson ..	A. P.	V. Wilson, Newstead
1167	Marquis Dundonald	A. D.	C. H. Fisher, Kenley
1163	Maurite ..	A. L.	O. S. Ovens, Cooma
1139	Mundell ..	3 D.	B. Storey, Teddywaddy
1169	Prince Alexander II.	A. D.	L. J. McDonald, Winchelsea
1158	Prince Buchlyvie..	A. D.	G. W. Pennel, Elsternwick
1170	Roseneath Baronet	A. D.	J. H. Fuge, Rutherglen
1150	Roseworthy ..	A. L.	E. Allen, Ondit
1146	Rostrata ..	6 L.	K. Urquhart, Hexham
1136	Royal Duke ..	A. D.	M. J. O'Brien, Hamilton
1164	Royal George ..	A. P.	S. O. Wood, Nagambie
1144	Scotland Again ..	A. D.	J. Mulholland, Eurobin
1140	Scotland Forever..	A. D.	S. Rogers, Rainbow
1135	Sir Bute ..	A. D.	A. McInnes, Boisdale
1132	Stylish Kennedy	A. D.	D. Revitt, Cobram
1162	Sungold ..	5 P.	H. Crawford, Victoria Valley
1142	Talisman ..	A. T.	C. A. Venables, Sale
1155	Thornfield Craig ..	A. D.	E. J. Leeder, Cope Cope
1149	Widgiewa Edward	A. D.	W. Down, Koonda
1168	Widgiewa Ninian	A. D.	W. Robertson, Lake Boga
1147	Widgiewa Sapper	A. D.	L. Little, Stradbroke
1148	Willie Craig ..	A. D.	A. T. Leishman, Kingston

*Note.—Age in years. A., aged; D., draught; L., light; P., pony; T., thoroughbred.

REGISTRATION REFUSED

List of Stallions in respect of which Certificates of Registration have been refused but which, the owners having paid the prescribed fee, may be retained for breeding purposes wi h owner's own mares.

Name.	Age* and Class.	Owner and Address.
Unamed	5 D.	Hill Bros., Boort
Baron Mac	4 D.	A. N. Reid, Lascelles
Baron, O. G.	6 D.	L. J. Vine, Ouyen
Bell Boy	4 T.	A. G. Turnbull, Coleraine
Bonnie Boy	3 D.	Mrs. M. Nelson and Son, Weering
Carngham Favour ..	4 D.	J. Pearce, Kewell North
Digger	6 D.	G. Fitzgerald, Hawkesdale
Eureka Sensation ..	4 D.	C. T. Lucas, Colbinabbin
Garrie Pollock ..	5 D.	H. Hayes, Toolleen
Ideal Ambassador ..	6 D.	C. J. Liesfield, Rainbow
Southern Boy	4 D.	W. L. Chaplin, Cowangie
Wakaperos Fashion ..	5 D.	Mrs. W. H. Fowler, Kerang

* *Note.*—Age in years. A., aged; D., draught; L., light; P., pony; T., thoroughbred.

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Year.	Number of Cows in Test.	Milk.	Test.	Butter Fat.	Butter Fat lb. with allowances for Heifers.
		lb.	%	lb.	
1927-28	14	9,177	3·67	336·85	399·21
1928-29	10	13,644	3·41	465·24	512·74
1929-30	10	11,831	3·40	399·45	456·95
1930-31	13	12,763	3·43	431·92	500·01
1931-32	10	10,116	3·69	369·00	417·00*
1932-33	10	10,512	3·65	378·53	434·53*
1933-34†	14	11,848	3·62	426·42	504·19*
Average	81	11,375	3·54	399·75	463·26

* In 1931-32 the allowances for heifers were reduced. Under the old scale these averages would have been 429·00, 448·53, and 520·65 lb. respectively.
† Records of cows that have completed the 1933-34 test to date.

The prices are based on the butter-fat production of the dam at the rate of 1/- per lb., except in the case of progeny of heifers without completed test, the price then being 10 guineas.

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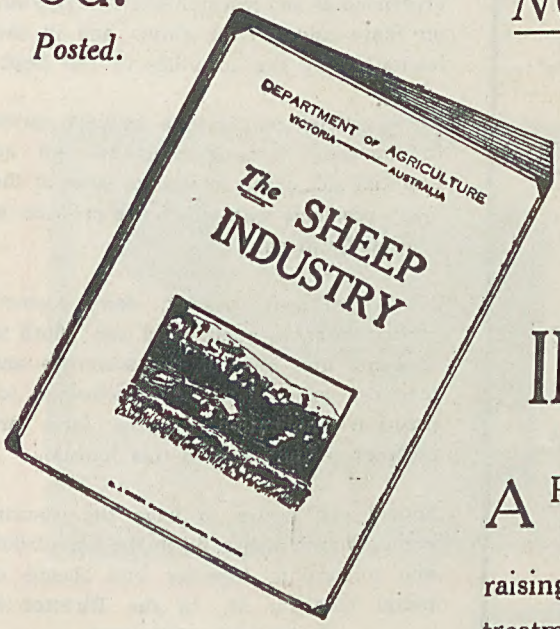

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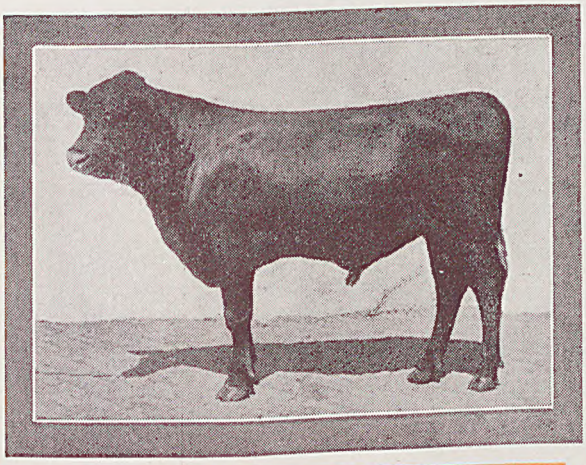

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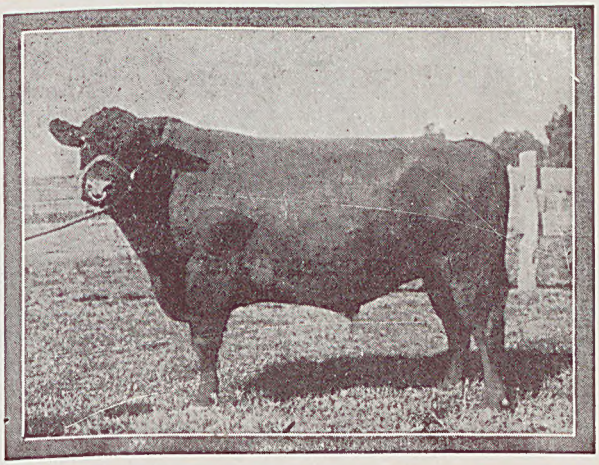

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